MUCEUM LIBRARY

NOV 2 1 1947

Old Series Vol. XXIII } CONTINUATION OF THE BULLETIN OF THE NORTHEASTERN BIRD-BANDING ASSOCIATION { New Series Vol. XVIII

BIRD-BANDING

A Journal of Ornithological Investigation

Vol. XVIII October 1947 No. 4

PUBLISHED FOR
THE NORTHEASTERN BIRD-BANDING ASSOCIATION
THE EASTERN BIRD-BANDING ASSOCIATION
AND
THE INLAND BIRD-BANDING ASSOCIATION

CONTENTS

PAGE

A FEMALE CARDINAL AND HER REFLECTION
By *George Miksch Sutton* 151

A DEVICE FOR APPLYING CELLULOID BANDS TO BIRDS' LEGS
By *B. M. Shaub* 155

THE FATE OF BANDED KENT ISLAND HERRING GULLS
By *Raymond A. Paynter, Jr.* 156

GENERAL NOTES:—Another Transatlantic Species, 170; Female Eastern Nighthawk, 170.

RECENT LITERATURE:—Banding, 171; Migration, 171; Physiology, 172; Flight, 173; Behavior, 173; Life History, 174; Oology, 175; Ecology, 176; Conservation and Wildlife Management, 176; Avifaunal Dynamics, 176; Geographic Distribution and Zoogeography, 183; Systematics, 185; Embryology and Development, 187; Evolution, 187; Books, 187.

BIRD-BANDING

A Journal of Ornithological Investigation

Vol. XVIII October 1947 No. 4

A FEMALE CARDINAL AND HER REFLECTION

By George Miksch Sutton

In an interesting note published some years ago in *The Migrant*, Willie Ruth Reed (1938: 17-18) described the behavior of an "uncommonly pugnacious" female cardinal, *Richmondena cardinalis* (Linnaeus), which persistently "attacked her reflection" in a window in Greeneville, Tennessee, in mid-January. A noteworthy accessory fact was that the male bird which accompanied this belligerent female "behaved as a bystander and never became sufficiently interested to join the attack on the persistent intruder."

On two occasions in mid-April, 1946, while walking from Forest Home (a suburb of Ithaca, Tompkins County, New York) to my office on the Cornell University campus, I watched a female cardinal attacking her reflection in a basement window at the end of a small school building. The behavior of this bird, and of a male cardinal which I saw with the female on one of the two occasions, was strikingly similar to that of the Tennessee birds.

There was no blind at the schoolroom window, but the building inside was dark and the glass mirrored the bird fairly clearly. This I confirmed by looking at the window with my head near the place from which the bird flew when making her attack—a branch between 5 and 6 feet from the ground and about 4½ feet from the window in the lower part of a spreading tree. A good deal of shrubbery (4 to 15 feet high) grew about the building and scattered small conifers stood near by. About 50 yards to the north, on slightly higher ground, was the edge of a dense planting of pines. About these pines I had repeatedly seen a male and female cardinal during the latter two weeks of February and the first week of April.

I first saw the female darting at the window on April 9. That morning, at about 6 o'clock, I noticed the chirping of two cardinals as I approached the school building, saw a male and female flitting about the shrubbery as I drew closer, and watched them move toward each other and out of the branches of the shrubbery. The sounds I heard

clearly indicated excitement, but rather than being incisive chirps of alarm these were throaty chuckles and tuneless warblings such as I had heard many times, some years before, from captive cardinals nibbling at each other's plumage or chasing each other about the house (see Sutton, 1941: 270). Observing the birds closely, I perceived that the female was responsible for most of the outcry. Just as I fully sensed this, she darted at the window, struck it lightly with her bill and feet, hovered near it an instant, and returned to her perch. Paying no attention to the male, which was about five feet away and at about the same distance from the ground as she, she moved up and down the branch, lifting her crest, swiftly wiping her bill, flashing her tail, and looking frequently at the window. Realizing by this time that she was watching the image of herself in the glass, I wondered whether she was attacking and trying to drive away this "third bird" or merely playing with it. The more I watched and listened the more surprised I was at the inattentiveness of the male, who moved farther away as the female darted again and again at the image, striking the glass with her beak (or beak, feet, and wings) during each attack, then returning to the perch to chirp, chuckle, and sing low snatches of song. After she had made nine or ten attacks she joined the male, and the two birds moved away from the building in a series of short flights. Presently the male flew to the ground about 40 yards off and began hunting food. The female now hopped to the top of the shrubbery, lifted her crest, and sang a full loud song of six or seven *whit-year* phrases.

The male did not respond to this song in any way so far as I could ascertain. He went right on looking for food on the ground. The female now returned to the window alone, took exactly the same position as before in the shrubbery, and began darting at the glass. Her call-notes clearly indicated that the image was stirring her emotionally. I say this advisedly, for I have observed the behavior of captive cardinals by the hour. The male did not join her at the window, though he could hardly have failed to hear her cries. She darted at the window seven times, flew away from the building, looked for food on the ground for a minute or so, then returned to the window for the third time, again going through the routine of chuckling, hopping about with body plumage and crest lifted, and darting at the window. It was quite apparent that she had remembered where that "third bird" was. That she (or she and the male) had been at the window many times was obvious from the numerous droppings on the ground under the perch and between the perch and the window.

On April 15, at 6:10 A.M., I again saw a female cardinal darting at the window. She struck the glass quite hard with her bill and more than once fluttered at it as if trying to get at the "bird" which she was seeing. She darted at the image six times, then flew round the building. I did not see the male at all that morning, though I saw him later in the

day. Studying my own reflection in the glass with eyes in about the position of the bird, I noted that neither the colors nor features were very distinct, but that the silhouette was clear.

The more I think about what I have reported above, the more I wonder at the male's failure to see, or at any rate to pay attention to, his own reflection in the window. The female's agitation roused his interest a little, I thought, but he never once darted toward his own reflection while I was watching him, and he displayed no inclination to linger about the window as the female did.

Mrs. Margaret Nice, who has been good enough to assist me in interpreting what I have just described, has reported (1945: 9) certain winter observations of cardinals at Columbus, Ohio, specifically one concerning a female bird which "darted at" another female trapped in a cage, others concerning females at a feeding-shelf, which "drove each other far more viciously than the males drove them or other males." Whether this can be called territory defense, strictly speaking, is questionable. It certainly is not winter territory defense comparable to that reported for the California Loggerhead Shrike, *Lanius ludovicianus gambeli* Ridgway, by Miller (1931: 149, 152), for the female shrike guards a considerable individual feeding ground against all shrike intruders. If it is winter territory defense at all, it is certainly more aggressive than that reported for the female mockingbird, *Mimus polyglottos* (Linnaeus), by the Micheners (1935: 99).

The New York cardinals discussed above almost certainly were paired. So far as I was able to ascertain there were no other cardinals in the immediate vicinity. They probably were on their nesting ground, though I noted little in the behavior of the male, aside from his occasional singing, which indicated that he was defending a territory *of any sort*. Since spring was well on its way, the female's fighting of her reflection could hardly have been defense of *winter* territory in the restricted sense of the phrase employed by Nice (1941: 464); nor was it defense of nest territory like that ascribed to the Northern Phalarope, *Lobipes lobatus* (Linnaeus), by Tinbergen (1935: 18). More than likely it was aggression against "trespassing females" comparable to that which Nice (1943: 166) observed among Song Sparrows, *Melospiza melodia* (Wilson), or "sexual fighting" like that reported for the female Snow Bunting, *Plectrophenax nivalis* (Linnaeus), by Tinbergen (1939: 65), in which "the situation that releases the sexual fighting is: another female Snow Bunting coming too near the male."

While consulting various articles pertaining to reflection-fighting by birds I found (a) that female Pied Wagtails, *Motacilla alba* (Linnaeus), and European Blackbirds, *Turdus merula* Linnaeus, observed by Brown (1937: 137-138) paid no attention to their reflections in mirrors, whereas the males of the respective pairs fought their own reflections vigorously; (b) that a female Magpie-Lark, *Grallina cyano-*

leuca (Latham), observed by Noel Roberts at Epping, near Sydney, New South Wales, paid no attention to her reflection in a mirror, whereas her mate "attacked his reflection so persistently that the mirrors were removed" (Hindwood, 1941: 23); and (c) that the female Blue Wren, *Malurus cyaneus* (Latham), of Australia has on several occasions been known to fight her reflection (Hindwood, 1941: 20-21).

Whatever the underlying cause of the female cardinal's pugnacity, we should bear in mind that the cardinal is one of the few American birds in which the female sings quite as well as, and possibly as frequently as, the male (see Shaver and Roberts, 1933: 116). The sexual bond may therefore be as stoutly maintained or guarded by the female as by the male.

LITERATURE CITED

BROWN, GEORGE
1937. Aggressive display of birds before a looking-glass. *British Birds*, 31: 137-138.

HINDWOOD, K. A.
1941. Birds and their reflections. *Proceedings Royal Zoological Society of New South Wales*, 1940-41: 20-29.

MICHENER, HAROLD AND JOSEPHINE R.
1935. Mockingbirds, their territories and individualities. *Condor*, 37: 97-140.

MILLER, ALDEN H.
1931. Systematic revision and natural history of the American Shrikes (Lanius). *University of California Publications in Zoology*, 38, no. 2, pp. 11-242.

NICE, MARGARET MORSE
1941. The role of territory in bird life. *Amer. Midl. Nat.*, 26: 441-481.
1943. Studies in the life history of the Song Sparrow, II. The behavior of the Song Sparrow and other passerines. *Trans. Linnaean Soc. New York*, 6.
1945. Adventures at a feeding shelf. *The Chicago Naturalist*, 8: 8-12.

REED, WILLIE RUTH
1938. A female Cardinal fights her reflection. *The Migrant*, 9: 17-18.

SHAVER, JESSE M., AND MARY BARRY ROBERTS
1933. A brief study of the courtship of the Eastern Cardinal (*Richmondena cardinalis cardinalis* (Linnaeus)). *Journ. Tennessee Acad. Sci.*, 8: 116-123.

SUTTON, GEORGE MIKSCH
1941. Crousty. The story of a redbird. Part 2. *Aud. Mag.*, 43: 270-278.

TINBERGEN, NICKOLAAS
1935. Field observations of East Greenland birds. *Ardea*, 24: 1-42.
1939. The behavior of the Snow Bunting in spring. *Trans. Linnaean Soc. of New York*, 5.

University of Michigan Museum of Zoology, Ann Arbor, Michigan.

A DEVICE FOR APPLYING CELLULOID BANDS TO BIRDS' LEGS

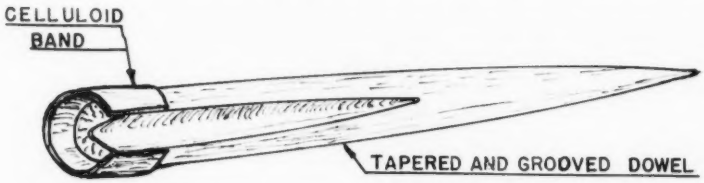
BY B. M. SHAUB

The writer has recently been assisting in the research on the movement of Evening Grosbeaks in the western part of New England initiated by Mr. Edwin Mason, Superintendent of the Arcadia Wildlife Sanctuary at Northampton, Mass. One of the phases of this research program is the use of distinctive color bands by the seven banding stations. This color banding, of course, facilitates the reporting of the movement of the banded birds by the many persons who maintain feeding stations and who are ready and willing to contribute their observations.

The attempt to apply the celluloid band to the bird's leg was, as many have experienced, a trying and difficult operation always attended with the fear that a slip sooner or later might result in an accident. It seemed at once that there must be an easy way to accomplish this operation.

The necessary procedure involved was obviously one to expand the tightly rolled band and bring the open edges around the leg of the bird before the expanded band was released. It was soon discovered that these two operations could be performed by using a tapered round rod of wood having at the large end a V-shaped slot cut about three-quarters of the diameter into the rod and tapering out to the surface in about two inches more or less depending on the diameter of the rod. The rod is four or five inches long and tapered to a point slightly less than a sixteenth of an inch or small enough to enter the hole through the tightly rolled band.

To apply a celluloid band to a bird's leg the band is slipped over the tapered end of the rod and pushed to a position where it overhangs the large end of the rod at the base about half the width of the band. The rod should be large enough so that the ends of the expanded bands are about even with the surface edges of the tapering slot. Fig. 1.



The bottom of the slot in the rod carrying the expanded band is then placed against the bird's leg and the band pushed over the base of the rod with a sliding push of the thumb while the rod is held in the hand. The pressure should be applied at one end of the opened band so that it will lead the other end and begin to wrap around the leg ahead of the other. When the band is released from the rod, its spring causes it to encircle the leg with a snap and a motion too fast for the eye to follow.

The operation is extremely easy and with reasonable care the maladjustment of a band rarely occurs. If it does happen, one can carefully expand the band by holding the edge of the band with a fingernail and remove it almost as easily as when the band is free and without injury to the bird.

Different sized rods will be convenient for different sized bands and the circumference of the rod should be about a third larger than the length of the unrolled band. The slot should, of course, be sufficiently deep so that the bird's leg will lie well within the edges and at the end of the rod slot when the band is released. An old-fashioned match stick provides an excellent medium for practice as well as some entertainment.

The rod can be whittled from any suitable piece of wood, but it can be made most easily from four- or five-inch pieces of hardwood doweling of sizes from one-quarter to one-half inches in diameter. While the bands are not distributed in sizes they do, however, vary considerably in length. A dowel five-sixteenths inch in diameter is satisfactory except for the extreme lengths of bands.

A rather sharp-edged, half-round wood file is an excellent tool for pointing the rods and for cutting the grooves.

159 Elm Street, Northampton, Massachusetts.

THE FATE OF BANDED KENT ISLAND HERRING GULLS[1]

BY RAYMOND A. PAYNTER, JR.

For the past thirteen years Bowdoin College has maintained a scientific station on Kent Island, Grand Manan, New Brunswick, Canada (Bay of Fundy, Lat. 44°35′N., Long. 66°45′W.). The island, an ornithological paradise situated at the junction of the Transition and Canadian faunal zones, is composed of one hundred and fifty acres of variable terrain. The northern end of the island supports a few

[1]Contribution number 17, Bowdoin Scientific Station, Kent Island, Bay of Fundy, New Brunswick, Canada, and Osborn Zoological Laboratory, Yale University.

hundred pairs of Herring Gulls, *Larus argentatus smithsonianus* Coues, along the shore and a large colony of Leach's Petrels, *Oceanodroma leucorhoa leucorhoa* (Vieillot), in the interior, and is covered with a thick stand of spruce. The central portion is a meadow where the buildings of the station are located, while the southern end is partly marshy with dead spruces occupying about seventy-five per cent. of the area. This section has a colony of an estimated thirty thousand nesting Herring Gulls, at least one thousand Eiders, *Somateria mollissima dresseri* Sharpe, one hundred Black Guillemots, *Cepphus grylle atlantis* Salomonsen, a few petrels, and about fifteen pairs of the Great Black-backed Gull, *Larus marinus* Linnaeus. The rugged shoreline, mud flats, and surrounding waters are rich in marine life, and offer an almost inexhaustible food supply for the more than one hundred species of resident and transitory birds.

Since 1934, as part of the program of the station, extensive bird banding operations have been carried on under the direction of Dr. Alfred O. Gross. Thus far, as illustrated in Table 1, a total of 1,635 adult and 34,557 immature Herring Gulls have been banded.

TABLE 1. HERRING GULLS BANDED AT KENT ISLAND

Year	Young	Adults	Total
1934	2,248	—	2,248
1935	6,754	50	6,804
1936	7,600	400	8,000
1937	4,651	200	4,851
1938	3,059	720	3,779
1939	3,000	110	3,110
1940	800	—	800
1941	1,300	155	1,455
1942	687	—	687
1943	2,258	—	2,258
1944	2,000	—	2,000
1945	200	—	200
	34,557	1,635	36,192

Returns have been received from 1,252 or 3.62 per cent. of the gulls banded when immature, and from 121 or 7.40 per cent. of the gulls banded as adults. These have come from a vast region extending from Newfoundland and Quebec on the north, to the West Indies, and Central America as far south as British Honduras. Most of the recoveries were made along the Atlantic seaboard, but two birds were recovered as far west as North and South Dakota, and one as far east as the northern coast of Spain.

The geographical distribution of returns in relation to migration routes and distances has been discussed by Dr. Gross in an earlier paper (1940). The purpose of this paper is to examine briefly the fate of the

1,373 gulls from which returns have been received up to December 31, 1945. This large number of returns distributed over an extended period, provides a unique source for reliable data on the fate of the Herring Gull.

I wish to express my appreciation to Dr. Alfred O. Gross of Bowdoin College for recommending this subject, and for his constant encouragement and assistance in its preparation. I am also indebted to Dr. Edward S. Deevey of Yale University for his aid in preparing the statistical aspects of the problem, and for his many helpful suggestions.

Three general methods of banding have been practiced. First, banding the young before they are able to fly. This is the most successful method and has accounted for 34,557 birds. Second, trapping the adults in large cage-like structures baited with herring. This is very effective if the herring schools are not abundant off shore, but it requires constant attention to prevent over-crowding and mortality. About twelve hundred birds have been banded in this manner. Third, "Jacking" the adults on foggy nights with a strong light. Approximately four hundred gulls have been banded by this more difficult procedure. In the future it is hoped to increase the operation, for within the last year it has proven a valuable method for obtaining longevity records and returns.

In recording the ages of the gulls, a July 1 to June 30 year has been adopted. All birds banded as adults are at least third or fourth year birds as they seldom return to the colony until the third, or more usually, the fourth year. An estimated five or six hundred first and second-year gulls are present on the island in the summer, but none have been banded.

Banding operations were begun in the summer of 1934 and the records arbitrarily terminated on December 31, 1945. This would seemingly be a ten and one-half year study, but no records were received from the Fish and Wildlife Service for this last half-year period, due to a wartime personnel shortage. Later reports show there were recoveries within this period, but for practical purposes the study will be considered as covering ten years.

The following facts should be borne in mind throughout this paper. Presumably, all banded birds suffering fates such as death in animal traps or fish nets are recovered and reported, while those dying from diseases, predators, etc., are recovered only by chance. Thus, not all returns are of equal significance. The fates closely allied with human activities appear more common than they actually are. For example, 54 of the 1,252 returns of birds banded when immature were recovered by fishermen. This is 4.31 per cent. of the total recoveries. However, it would be incorrect to say that nearly one-twentieth of Kent Island Herring Gulls suffer death in the fishing industry, because we are reasonably certain the 54 returns are the *only* birds, of the 34,557 banded, suffering this fate. Therefore, it is more nearly correct to state the mortality rate for this cause as .15 per cent., or three in every two thousand gulls.

The next consideration is the pronounced variation in age distribution. Although the records cover a ten-year period, and banding has been carried on throughout that time, the reliability of the data decreases in the older age groups because only a relatively small number of birds have been banded the full ten years. This number increases in the lower age brackets, making the data more reliable. To determine the life expectancy and mean age, certain adjustments must be made.

CAUSES OF DEATH

In analyzing the returns, two main divisions are formed—one for birds banded when adults, and the other for birds banded when immature. These have been broken down into Tables 2, 3, and 4, with fourteen classifications indicating the type of recovery and the order of frequency. The classifications are rather arbitrary because there is no definite procedure for reporting banded gulls and the reports are often incomplete in the details of the manner of recovery. This necessitates an unknown degree of error in the percentages of recoveries by various causes. For example, some gulls are reported as "found." This may mean found dead, found injured, etc.

I. FOUND DEAD: 695 RETURNS. The largest number of reports merely state, "found dead." It is obvious this is a general statement and throws no light on the cause of death.

Six hundred and seventy or 53.51 per cent. of the returns from gulls banded when immature are reported in this manner. The first-year birds make up 43.58 per cent. of the total, and the number grows progressively smaller as the age advances. Even considering the inaccuracies of the age distribution, this correlation seems attributable to a general weakness experienced during moulting, fatigue from the long migration flights which gradually diminish as the gulls grow older, and the lack of experience to cope with the frequent hazards which beset any bird.

The returns by states for this group show New York with one-fifth of the recoveries. This may be explained by the presence of a large harbor and garbage dumps which provide abundant food for birds of scavengering habits, plus the large number of observers and ornithologists affording a greater opportunity for the recovery of dead gulls.

The returns from gulls banded as adults vary greatly from the preceding group. Only slightly more than one-fourth of the total recoveries are classified as "found dead." This further substantiates the theory that the combined forces of migration fatigue, moulting weakness, and lack of experience may be the prime causes of death for the younger gulls.

II. CAUGHT: 115 RETURNS. Nearly all the birds reported as "caught" could have been placed under other divisions if the persons reporting had been acquainted with the need for details and accuracy.

TABLE 2
RECOVERIES OF GULLS BANDED AS ADULTS

Fate	New Brunswick	Nova Scotia	New York	Mass.	Maine	Virginia	Connecticut	Louisiana	Maryland	New Jersey	North Carolina	Rhode Island	Total	%
Found Dead	15	3	8	4	2	1				1		1	35	28.92
Collected	33												33	27.27
Captured and Released	21												21	17.35
Found	1	4						1					6	4.95
Injured or Ill	3	2		1									6	4.95
No Information	2	3		1									6	4.95
Shot	2	1		1			1						5	4.13
Caught by Fisherman		3									1		4	3.30
Caught		2											2	1.65
Dropped by Eagle						1							1	.82
Caught in Muskrat Trap									1				1	.82
Probably Found Dead		1											1	.82
Total	77	19	8	7	2	2	1	1	1	1	1	1	121	100%
%	63.63	15.70	6.61	5.78	1.65	1.65	.82	.82	.82	.82	.82	.82		

TABLE 3

RECOVERIES BY STATES OF GULLS BANDED AS YOUNG

Fate	New York	New Brunswick	Massachusetts	Florida	New Jersey	Nova Scotia	Maine	Virginia	Louisiana	North Carolina	Texas	Connecticut	Georgia	Mississippi	Rhode Island	Alabama	Newfoundland	Maryland	South Carolina	Delaware	Prince Edward Island	Mexico	New Hampshire	Ohio	Ontario	Pennsylvania	Quebec	Cuba
Found dead	139	80	73	36	60	38	49	32	13	21	18	27	11	7	17	7	3	8	6	6	3	1	3	3	1	3	2	1
Caught	3	6	1	21	4	5	10	6	16	11	6		2	5	1	5	2		2		1	3			1			1
Injured or ill	16	14	7	6	6	10	2	5	6	4	2	1	1	3		4	1	2		3		1			1			
Shot	6	3	3	5	2	9	5	3	2	2	4		5	2	1		8	1	1			1						
Found	6	8	4	3	5	6	6	3	4	4	2		1	2	1						1						1	
Caught by fisherman	3	3		3	1	12	3	9	2	4	4		3	1		1	1	2	1				1					
Probably found dead	2	6	2	3		3	2	2	2		3			2	1	2			1		3							
Killed	5	5			1	1			1		1		2			2	5	1	1			1						
Captured and released		23	1																									
No information	1	4	2	7	1			3	1		3						1											
Caught in muskrat trap									12		1			1		1			1	2								
Collected		13								1				1														
Band recovered		5			1		1		1	1	2																	
Killed by automobile				2	3			1			1	1																
Killed by airplane	3		2	2															1									
Taken			1				1		2					1														
Shot under gull control permit																		4										
"Oiled"											2																	
Found tied to another gull													1		1													
Came aboard ship at sea																												
Killed by eagle							1																					
Killed by train					1																							
Caught in scoot bin							1																					
Band found in fox den															1													
Observed				1																								
Caught in fence				1																								
Tame bird				1																								
Fell down chimney				1																								
Killed by fish unloading machine										1																		
Foot found in fish stomach		1																										
Caught in hog pen										1																		
Choked to death on mullet										1																		
TOTAL	184	171	96	92	85	84	81	64	62	51	49	29	26	25	23	22	21	18	14	11	8	7	4	3	3	3	3	2
PER CENT.	14.69	13.65	7.66	7.34	6.78	6.70	6.46	5.11	4.95	4.07	3.91	2.31	2.07	1.99	1.83	1.75	1.67	1.43	11.11	.87	.63	.55	.31	.23	.23	.23	.23	.15

TABLE 3

RECOVERIES BY STATES OF GULLS BANDED AS YOUNG

	North Carolina	Texas	Connecticut	Georgia	Mississippi	Rhode Island	Alabama	Newfoundland	Maryland	South Carolina	Delaware	Prince Edward Island	Mexico	New Hampshire	Ohio	Ontario	Pennsylvania	Quebec	
3	21	18	27	11	7	17	7	3	8	6	6	3	1	3	3	1	3	2	
5	11	6		2	5	1	5	2		2		1	3			1			
5	4	2	1	1	3		4	1	2		3		1			1			
2	2	4		5	2	1		8	1	1			1						
4	4	2		1	2	1						1						1	
2	4	4		3	1		1	1	2	1				1					
2		3			2	1	2			1		3							
1		1		2			2	5	1	1			1						
1		3						1											
2		1			1		1			1	2								
	1				1														
1	1	2																	
		1	1																
										1									
2					1														
									4										
		2																	
				1		1													
						1													
	1																		
	1																		
	1																		
2	51	49	29	26	25	23	22	21	18	14	11	8	7	4	3	3	3	3	
5	4.07	3.91	2.31	2.07	1.99	1.83	1.75	1.67	1.43	11.11	.87	.63	.55	.31	.23	.23	.23	.23	

Quebec	Cuba	British Honduras	Indiana	Jamaica	Kentucky	Lat. 46° 30' N. Long. 14° W.	Michigan	Missouri	North Dakota	South Dakota	Tennessee	Vermont	TOTAL	PER CENT.
2	1							1				1	670	53.51
	1	1											113	9.02
													95	7.58
				1					1	1	1		67	5.35
1								1					58	4.63
													54	4.31
													34	2.71
						1							27	2.14
			1										25	1.99
													23	1.83
													18	1.43
													15	1.19
													11	.87
													8	.63
													8	.63
													5	.39
													4	.31
													2	.15
													2	.15
							1						1	.07
													1	.07
													1	.07
													1	.07
													1	.07
													1	.07
													1	.07
													1	.07
													1	.07
													1	.07
													1	.07
													1	.07
3	3	2	1	1	1	1	1	1	1	1	1	1	1,252	100%
.23	.23	.15	.07	.07	.07	.07	07	.07	.07	.07	.07	.07		

TABLE 4

AGE OF RECOVERY OF GULLS BANDED AS YOUNG

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th

TABLE 4

AGE OF RECOVERY OF GULLS BANDED AS YOUNG

Fate	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	Total	%
Found dead	292	161	81	48	41	25	8	6	7	1	670	53.51
Caught	90	11	6	3		2	1				113	9.02
Injured or ill	53	13	10	5	6	2	3	1		2	95	7.58
Shot	48	11	3	1	2	1	1				67	5.35
Found	19	17	9	7	2	3			1		58	4.63
Caught by fisherman	39	9	2			1	2	1			54	4.31
Probably found dead	21	7	1	1	3	1					34	2.71
Killed	22	3	2								27	2.14
Captured and released				5	6	7	6	1			25	1.99
No information	16	4			1	1	1				23	1.83
Caught in muskrat trap	16	2									18	1.43
Collected	3	1			2	4	5				15	1.19
Band recovered	4	4	2	1							11	.87
Killed by automobile	4	2	1		1						8	.63
Killed by airplane	8										8	.63
Taken	3	1					1				5	.39
Shot under gull control permit		3	1								4	.31
"Oiled"	2										2	.15
Found tied to another gull	2										2	.15
Came aboard ship at sea		1									1	.07
Killed by eagle	1										1	.07
Killed by train		1									1	.07
Caught in scoot bin								1			1	.07
Band found in fox den		1									1	.07
Observed	1										1	.07
Caught in fence	1										1	.07
Tame bird	1										1	.07
Fell down chimney	1										1	.07
Killed by fish unloading machine	1										1	.07
Foot found in fish stomach	1										1	.07
Caught in hog pen		1									1	.07
Choked to death on mullet		1									1	.07
Total	650	253	118	71	64	47	28	10	8	3	1,252	100%
%	51.91	20.20	9.42	5.67	5.11	3.76	2.23	.79	.63	.23		

The first-year birds are most susceptible to recovery with approximately 80 per cent. of the returns. The second-year birds show a sharp decrease to 10 per cent. This sudden drop is due to a shortening of the migration limits which removes the birds from the muskrat trapping regions of Louisiana where many returns are received as simply "caught" rather than "caught in a muskrat trap," which is the twelfth most numerous cause for recovery.

There are only two returns for the adult grouping. Both are from Nova Scotia where the fishing industry claims the lives of many gulls. These are, in all probability, the results of fishing accidents.

III. ILL OR INJURED: 101 RETURNS. The terms "ill" and "injured" have been combined because of the difficulty in diagnosing the bird's malady. Ninety-five or 7.5 per cent. of the recoveries of birds banded when young were from this cause. Again the first-year birds were most numerous, with 53 recoveries. Only 13 second-year birds were recovered, and there is a regular decline in the succeeding ages.

By states the recoveries for New Brunswick, Canada are greatest with a total of 14 birds. The presence of students in the field at the Bowdoin Scientific Station, as well as the existence of the gulls for over half the year in a colony, account for the numerous returns in an isolated locality.

Breeding activities are perhaps the outstanding causes of injury and illness on the island. During the mating season and the establishment of nesting territories, the gulls fight and in their hurried flights through the dead spruces not uncommonly fly into limbs, impaling themselves on the sharp ends. Also, birds often become caught in the underbrush or in cracks in logs and are attacked by rival gulls until they free themselves, badly injured, or die.

Only 5 per cent. of the gulls banded when mature are found ill or injured. This is a difference of 2.5 per cent., and indicates further a tendency for the younger birds to be more susceptible to injuries and illness.

IV. SHOT: 72 RETURNS. Sixty-seven or 5.35 per cent. of the returns from the birds banded as juveniles are received in this manner. It is possible the number would be even greater if the fear of prosecution did not cause many returns to be sent in as merely "killed."

Forty-eight returns are from first-year gulls. The heaviest returns for districts come from Newfoundland and Nova Scotia where shooting is permitted as a means of control. The single returns from Jamaica, South Dakota, North Dakota, and Tennessee come from this source and prove to be new migration records for Kent Island gulls. Five or 4.13 per cent. of the recoveries for the adult division fall in this classification.

V. FOUND: 64 RETURNS. Nineteen first-year birds and 17 second-year birds were incompletely reported as "found." There is a regular decline in the remaining years.

There are six returns in the adult division. A Louisiana return is the

only record of an adult Kent Island gull being recovered so far south. This bird was banded as an adult, indicating it was at least three years old, on July 3, 1939, and recovered in March of 1940.

VI. CAUGHT BY FISHERMEN: 58 RETURNS. Because the Herring Gull is a scavenger, large flocks congregate among the fishing boats and wharves to take waste fish from the decks and occasionally bait from trawl lines. These habits are the cause of death or recovery for many gulls.

Fifty-four of the returns from gulls banded as young come from this cause. The first-year birds caught in this manner total 39, while there are only nine second-year birds.

An unusual recovery was made by Mr. Colon S. Morrison, a fisherman of Perry, Maine, who found a sixth-year bird (number 36-64889) with only one leg in the bottom of his boat. The bird had gorged itself on fish offal until unable to fly. We may only speculate on the manner in which the bird lost its leg.

Four or 3.30 per cent. of the returns for birds banded as adults are from fishermen.

VII. COLLECTED: 48 RETURNS. This is the only grouping in which returns from gulls banded as adults total more than those from birds banded when young. Thirteen of the 15 recoveries in the division of banded immature birds come from Kent Island where they are collected during investigations. The two remaining returns are from Mississippi and North Carolina.

Thirty-three or 27.27 per cent. of the returns in the adult division also come from collecting operations at Kent Island. There are no returns from other districts.

VIII. CAPTURED AND RELEASED: 46 RETURNS. In the process of banding adult gulls by means of traps or jacking, 46 previously banded birds were recovered. Twenty-five were banded when young and 21 when adults. The only return from Indiana comes from this source and there is also a return from Massachusetts. Presumably both birds were caught in animal traps. The 21 returns from gulls banded when adults are from Kent Island.

IX. PROBABLY FOUND DEAD: 35 RETURNS. Thirty-four gulls banded when immature and one as an adult are reported in a manner which fails to specify distinctly the cause of recovery, but merely hints at finding the bird dead.

X. NO INFORMATION: 29 RETURNS. Twenty-nine reports were received in which details, other than the band numbers and states in which the birds were recovered, are lacking. Twenty-three of the recoveries are from birds banded as young and six from adults.

XI. KILLED: 27 RETURNS. None of the gulls in the adult division are re-

ported as killed, but there are 27 in the immature group. The exact circumstances of death are a matter of conjecture.

XII. CAUGHT IN MUSKRAT TRAP: 19 RETURNS. Eighteen or 1.43 per cent. of the returns from gulls banded as young and one banded as an adult were received from trappers. Sixteen are first-year birds and two second-year birds. The returns by states are primarily in the southern regions where the muskrat industry is concentrated. The predominance of young birds caught is not attributable to lack of experience because only immature gulls migrate into these regions.

While the records do not show a very large percentage of returns from this source, it should be remembered many "caught" returns come from the states also showing an abundance of trapping records. This leads one to believe the term "caught" should frequently be interpreted as "caught in a muskrat trap."

XIII. BAND RECOVERED: 11 RETURNS. Eleven reports state "band recovered," probably meaning from a dead gull.

XIV. MISCELLANEOUS: 43 RETURNS. The 19 fates occurring most infrequently have been placed under this classification. Twelve fates have occurred only once in the combined total of 1,373 returns. Only one return is from a bird banded as an adult. The majority of the records are from first and second-year birds, but one gull is reported "taken" in its seventh-year, and another was "caught in a scoot bin" at a canning factory in its eighth year.

Automobiles and airplanes both took a toll of eight birds. Three were killed by planes in New York, two in Massachusetts, two in Florida, and one in South Carolina. All were first-year birds and all were killed either at an airport or in the vicinity of one.

Considerable effort was made to contact the observers of these unusual accidents, but in many instances they were servicemen who moved so frequently their addresses were lost. However, information was received from two recoverers and from pilots who, although not ornithologists, have had considerable flying experience.

Mr. Earle F. Cook, Jr., of Dorchester, Massachusetts, reports the following incident. While he was along the shore of Savin Hill Bay, Dorchester, early one morning in October, 1944, two planes based at the Squantum Naval Air Station flew over the bay frightening a group of feeding Herring Gulls into the air. As the planes circled for a landing, the gulls flew to a slightly higher altitude. Suddenly gull number 36-650733 dropped down between the two planes and was caught in the slipstream of the first and thrown into the propeller of the second. As the mangled bird was thrown into the air and then fell into the water, the motor skipped, but the pilot seemed to have no difficulty in keeping the plane under control.

Gull number 39-662465 was killed in October, 1943, at the Charleston Naval Air Station. Mr. J. W. Eddy, who made the recovery, reports that gulls flock on the warm asphalt runways during cool weather, but the noise of the engines usually frightens them off in ample time. This bird, the only incident of which he knows, was struck by the leading edge of the wing of a plane as it took off, but inflicted no damage to the plane.

Pilots have reported striking birds, resulting in near accidents, while "wave skipping" over the Gulf of Mexico. At such speeds it is impossible to identify the birds, but pilots have expressed the opinion gulls are the principal victims. A naval officer reports one case where a plane crashed, killing the pilot, after hitting an unidentified sea bird. He has official photographs of the accident which may not be published.

Five birds are reported as "taken." Two returns are from Louisiana and therefore may refer to birds caught in animal traps. During the winter of 1937 three second-year birds and one third-year bird were shot in Baltimore, Maryland, under a Herring Gull Control permit. Two birds were recovered in Texas with oiled plumage.

In Georgia and Rhode Island two unusual but similar recoveries were made. In some manner a banded gull became tied to another gull by the leg. This may have been the result of pranksters who found the birds disabled and tied them together; or more probably the gulls were feeding in dumps and became entangled in strings.

The longest and most unusual migration flight of a Kent Island gull was made by number 36-648130. This gull was banded when a bird of the year on August 13, 1936, and recovered alive in November, 1937, aboard a ship off the northern coast of Spain at Lat. 46°30′N., Long. 14°W., approximately 2,600 miles from Kent Island.

Two birds are reported killed by eagles. One banded August 10, 1940, was killed at Lubec, Maine, on May 22, 1941. The other was banded August 15, 1938, as an adult, and recovered in Driver, Virginia, on April 1, 1940.

The remaining returns refer to fates occurring only once in the records and are listed in Tables 3 and 4.

THE IMPORTANCE OF HUMAN INFLUENCE

The question now arises, What effect does human activity have upon the mortality rate? The returns from birds banded when immature have been grouped in Table 5 under two headings.

1. "Natural recoveries" which strictly embrace the 674 recoveries of dead birds which, insofar as we can ascertain, died without direct human influence. The classifications in question are "found dead," "killed by an eagle," "band found in fox den," "band found in fish stomach," and "choked to death on mullet."

2. "Artificial recovery," which embraces the remaining 578 returns

including birds recovered alive as well as those dying from human activity.

In this manner, in spite of unrectifiable errors in classification and reporting, two approximately equal categories are formed.

From Table 5 it is evident that there is little difference between "natural" and "artificial" deaths with respect to ages at which they occur, with the possible exception of the first year of life. In this year, 46 per cent. of the natural deaths occur, while 60 per cent. of the artificial deaths are recorded. Since changing one percentage will change the rest, the usual methods of testing the statistical significance are not applicable to the first-year values. We may, however, examine the influence of the first-year differences on the mean length of life.

TABLE 5

NATURAL AND ARTIFICIAL RECOVERIES

Age	1	2	3	4	5	6	7	8	9	10	Total
Natural recovery	294	163	81	48	41	25	8	6	7	1	674
Per cent.	46.20	24.18	12.17	7.12	6.09	3.70	1.18	.89	1.03	.01	
Artificial recovery	356	90	37	23	23	22	20	4	1	2	578
Per cent.	60.16	15.50	6.40	3.97	3.97	3.80	3.46	.69	.17	.34	
Total	650	253	118	71	64	47	28	10	8	3	1,252
Per cent.	51.91	20.20	9.42	5.67	5.11	3.76	2.23	.78	.63	.23	

The mean length of life of birds recovered artificially is $2.3 \pm .23$ years, while those dying naturally live $2.5 \pm .16$ years. The difference between these two means, 0.2 years, proves to be only .34 times its own standard error, and hence cannot be adjudged significant. We are therefore justified in taking the mean length of life of the whole series, $2.44 \pm .12$ years, as the best approximation to the truth. It follows that human activities have essentially no influence on the life span of the Herring Gull, which is not regularly shot or trapped, and that those birds which died from human interference would, in all probability, have died at about the same time from natural causes.

EXPECTATION OF LIFE AND THE MAINTENANCE OF THE POPULATION

The data of Table 5 can be cast in the form of a conventional *life table*, so that the expectation of life, or mean after lifetime at any age,

can be calculated. This is done in Table 6, according to the method of Pearl (1940).

The symbol d'_x represents the original data values for age at death of the whole population, corrected for the fact that decreasing numbers of returns at greater ages are to be expected simply because the elapsed time has been less. In ten years of banding operations there are ten years in which first-year returns can be expected. The returns are therefore divided by 10, to give the number of first-year returns per year. The nine-year total of second-year returns is divided by 9, etc.

Using the resulting values of d'_x as representing the original, or "raw" data for deaths at age x, and converting these to a relative (per thousand) basis, the life table functions are calculated. These are d_x, the number of deaths at age x; l_x, the number of survivors at age x out of 1,000 hatched; q_x, the mortality rate per 1,000 alive at the beginning of the age interval; and e_x, the mean after lifetime remaining to individuals attaining age x.

Table 6 shows, in the l_x and q_x columns, first, that there is very heavy mortality in the first year of life, as might be expected in a natural population. Second, that after the third year, there is a more gradual decline in the number of survivors. Third, that at the fourth year (breeding year) there are 30.5 birds surviving out of 100 banded. From the e_x column it is seen that there is an increase in the life expectancy until the fourth year, at which point the mean after lifetime drops to 2.64 years.

No data are available on the mortality rate between laying and banding and there are also differences of opinion as to the average number of eggs laid per nest. Townsend (in Bent, 1921) says, "Three eggs constitute a set, although the number is sometimes only two, and in very rare cases one or four." Gross (1940) gives an average of 1.93 eggs which is based on the work of one of his students at Kent Island. The census may have been taken either early or late in the nesting season and therefore too low. Information accumulated since 1940 by Dr. Gross, but not yet analyzed in detail, suggests that the correct figure is approximately 2.5 eggs per nest. However, accepting these disparities, we may tentatively estimate the rate of reproduction and expose the errors in the life expectancy data.

To compute the rate of reproduction, we must assume banding takes place at hatching rather than later, and we must also assume the number of males and females is equal throughout the life span.

If of 100 birds hatched, 30.5 survive to breed and breed for 2.64 years, laying 1.93 (Gross) eggs per year, 80 eggs are laid per one hundred gulls hatched. If the number of eggs per nest is 3 (Townsend), the total is 119.26 eggs.

The calculations suggest that the number of eggs per nest must be between 1.93 and 3.0 eggs if the population is to remain constant. It

TABLE 6

LIFE TABLE BASED ON RETURNS OF 1,252 BIRDS BANDED AS CHICKS AT KENT ISLAND 1934-45

x	d'x	dx	lx	1000 qx	ex
Age in years	Average number of birds dying at age x in any given year	Number dying in age interval out of 1000 hatched	Number surviving at beginning of age interval out of 1000 hatched	Mortality rate per 1000 alive at beginning of age interval	Expectation of life remaining to those attaining the age interval (expressed in years)
0-1	65.0	419	1000	419	2.44
1-2	28.1	181	581	311	2.82
2-3	14.8	95	400	238	2.88
3-4	10.1	65	305	213	2.64
4-5	10.7	69	240	288	2.20
5-6	9.4	60	171	351	1.90
6-7	7.0	45	111	405	1.66
7-8	3.3	21	66	318	1.46
8-9	4.0	26	45	577	.91
9-10	3.0	19	19	1000	.50

must not be forgotten, however, that the origin of the life table has been taken at the chick stage, when banding first becomes practicable, and the egg and downy-young mortality have been left out of account. This is an error which operates to make the above calculations too high. If we assume the rather Utopian number of 3 eggs, we find that at least 19 birds are lost between the egg stage and the age of banding. This seems to be too small a margin of safety, for Kendeigh (1942) has shown that even among passerine birds few species are successful in rearing to the age of fledging so high a proportion of young. Since the reproduction potential cannot be much higher than 3 eggs per pair per year of breeding activity, and since field experience indicates that the population is not declining, it is evident that the life expectancy as calculated from the life table is too low to fit the facts.

There are two sources of error which can be supposed to operate in this direction, and it appears that when correction can be made for these the life expectancy and the reproduction potential will balance each other. One of these is the arbitrary termination of the observations after ten years of banding. From other banding stations (Cooke, Gross) we know that some returns from Herring Gulls may be expected until at least the fifteenth year. There is no reason to suppose that Kent Island Gulls do not live so long; they may even live longer. The second source of error, which is probably less significant quantitatively, lies in the assumption of equal sex ratios throughout the life span. It is known, from studies with other animals (see, for example, MacArthur and Baillie, 1932) that the longevity of females is in general longer than that of males. If female Herring Gulls live longer than males, i.e. longer than the whole population assumed to show equal sex ratios throughout life, the reproductive potential of the breeding birds will be automatically enhanced.

These calculations, insufficient as they inevitably are, should serve to illustrate the advantage of the life table method of analyzing data. The weaknesses in the computations are easily seen and enable us to hazard assumptions which should not prove to be too far from the truth when additional information is available.[1]

[1]Since this manuscript was accepted for publication a paper has appeared by Hubert Marshall (*Auk*, 64(2): 188-198, 1947) in which the longevity of the Herring Gull is discussed. This study is based on the Fish and Wildlife Service records and presumably includes returns from Kent Island. Several discrepancies in our findings are evident. These will be discussed in the near future when research on the downy-young mortality is completed and the problem can be reconsidered in the light of new findings.

REFERENCES

BENT, A. C.
1921. Life Histories of North American Gulls and Terns. *Bull. 113, U. S. Nat. Museum.*

COOKE, M. T.
1937. Some longevity records of wild birds. *Bird-Banding*, 8: 52-65.
1946. Returns of banded birds: Some recent records of interest. *Bird-Banding*, 17: 63-71.

GROSS, A. O.
1940. The migration of Kent Island Herring Gulls. *Bird-Banding*, 11: 129-155.

KENDEIGH, S. C.
1942. Analysis of losses in the nesting of birds. *The Journ. of Wildlife Management*, 6: 19-26.

MACARTHUR, J. W., AND W. H. T. BAILLIE.
1932. Sex differences in mortality in Abraxas-type species. *The Quart. Rev. of Biology*, VII: 313-325.

PEARL, R.
1940. *Introduction to Medical Biometry and Statistics.* 3rd edition, Philadelphia, W. B. Saunders Co., 537 pp.

Osborn Zoological Laboratory
Yale University
New Haven, Connecticut.

GENERAL NOTES

Another Transatlantic Species.—The Ring-billed Gull is now added to the list of species that have made transatlantic flights. Ring-billed Gull 41-669469, banded as an immature, June 10, 1945, in Georgian Bay, on Gull Island, five miles west of Penetang, Ontario, by H. H. Southam, was killed November 4, 1945, at Horta, island of Fayal in the Azores.—MAY THACHER COOKE, U. S. Fish and Wildlife Service.

Female Eastern Nighthawk No. 44-201539 is nesting for at least the third consecutive season on the roof of Weaver High School in Hartford, Connecticut. We are now able to add another brief chapter to the story of this bird which was begun in *Bird-Banding* 17(2): 55-60 and continued in 17(4): 168.

As in the case of each of the two previous years, two eggs were laid. These were discovered on June 17. One was very slightly the larger, measuring, in mm., 30.0 by 23.0 as compared with 29.8 by 22.6 for the other egg. The difference in size fails to explain satisfactorily the great difference in weight, however, for the eggs weigh 5.46 g. and 2.65 g. respectively.

There is reason to believe that neither egg is developing normally. The heavier one has a circular depression about 2.5 mm. in diameter in the shell where it has been crushed slightly inward. The subnormal weight of the other egg suggests some very serious imperfection in its condition.

The distribution of weight of the contents within the shell of each egg is such that the center of gravity is close to the smaller, more pointed end. The significance of this condition became apparent as the result of the bird's selection of a smooth tarred area for her nesting site. This space of about thirty square inches has none of the pebbles which cover most of the roof. As we watched repeated gusts of wind blew against the eggs. Instead of rolling from the "nest" they spun around, each following its own little circular path with its weighted end pointed inward towards the center.

Our final visit to the roof showed the bird incubating the heavier egg in the "nest" while the lighter one lay just over a foot away among the pebbles. Apparently its lighter weight had failed to anchor it against the breeze.—G. HAPGOOD PARKS, 99 Warrenton Avenue, Hartford 5, Connecticut.

RECENT LITERATURE

Reviews by Donald S. Farner and others

BANDING

1. *Zosterops lateralis* at Dunedin, New Zealand. B. J. Marples. 1945. *The Emu*, 44(4): 277-287. This is a collection of interesting notes and data on the White-eyes collected in trapping and banding operations over six years. Mean weights reach a maximum, 14.55 grams, in the second half of June. The minimum apparently occurs in November or December; however, data are lacking. There is a diurnal weight fluctuation of seven percent. "The mean daily weight shows an inverse correlation with the mean daily air temperature." The males are probably slightly larger than the females since in all cases, except culmen, the measurements are larger than those of the female. However, the differences are too slight to establish statistical reliability.—D. S. F.

2. Recoveries of Birds Banded in Foreign Countries. (Terugvondsten van in het buitenland geringde vogels, 20.) C. G. B. ten Kate. 1947. *Limosa*, 20(1-3): 181-186. This paper contains records of 67 birds of 23 species banded in foreign countries and recovered in the Netherlands. Among the interesting records are a Barn Owl, *Tyto alba* Scopoli, banded in Oldenburg in Germany as a juvenal July 1944, and recovered in the Noordoostpolder, November 1944; also a juvenal Barn Owl banded in Brussels, Belgium, 15 June 1944 and recovered in Zeeland 18 February 1945; a Pintail, *Anas acuta* Linnaeus, banded at Moscow 3 August 1944 and recovered in Noord-Brabant 4 February 1946; and a Lapwing, *Vanellus vanellus* (Linnaeus), banded as a juvenal in Czechoslovakia 27 May 1944 and recovered in Zuid-Holland 21 November 1944. Eighteen Black-headed Gulls, *Larus ridibundus* Linnaeus, were recovered, including four banded as juvenals in Czechoslovakia.—D. S. F.

MIGRATION

(See also Numbers 2 and 5.)

3. The Course of Spring Migration of the Red-backed Shrike. (Der zeitliche Ablauf des Frühjahrszuges beim Neuntöter *(Lanius collurio)*.) Erwin Stresemann. 1944. *Ornithologische Monatsberichte*, 52(1/2): 1-10. The Red-backed Shrikes which breed in Europe west of 20° E in autumn migrate southeastward to eastward and reach Africa by crossing the eastern part of the Mediterranean Sea. The winter area consists of savannahs and brush steppes in East Africa, South Africa, and Southwest Africa. The migratory distance may be as great as 12,000 kilometers. The spring migration lasts about 60 days, whereas the fall migration lasts about 100 days. Ninety days are spent in the breeding area and 110 days in the winter area. It is estimated that in spring the average distance covered per night of migration is 500 km. "In order to accomplish 1,000 km., it [Red-backed Shrike] needs on the average five times 24 hours. Of these two nights are used for migrating, three nights for sleeping, and five days for resting and procuring food." (p. 8.) In fall migration is slower with longer periods of rest.—D. S. F.

4. The Course of Spring Migration of the Black-headed Bunting. (Der zeitliche Ablauf beim Kappenammer, *Emberiza melanocephala* Scop.) Erwin Stresemann. 1944. *Ornithologische Monatsberichte*, 52(3/4): 85-92. The Black-headed Bunting winters in Deccan (southern India); from this area to the most remote breeding localities in Dalmatia and Istria the distance is about 7,000 kilo-

meters. Spring migration ends with the first breeding birds in Dalmatia about 5 May after a period of approximately 48 days. Available data indicate a migratory rate of 1,000 kilometers per seven days, of which two nights may be used for migration, five nights for sleeping, and seven days for feeding and resting. This is slower than the Red-backed Shrike, *Lanius collurio*, which, in spring, migrates 1,000 kilometers in about five days. The fall migration of the Black-headed Bunting is at about the same rate as spring migration. The Dalmatian population of *Emberiza melanocephala* Scopoli, spends 180 days in the winter area in India, 48 days in spring migration, 90 days in the breeding region, and 48 days in fall migration.—D. S. F.

PHYSIOLOGY

(See also Number 10.)

5. The Physical Possibility of a Sense of Orientation Based on the Rotation of the Earth. (Die physikalische Möglichkeit eines tierischen Orientierungssinnes auf Basis der Erdrotation.) Gustaf Ising. 1945. *Arckiv för Matematik, Astronomi och Fysik*, Band 32A. N:o 18. 23 pp. In considering the possible senses involved in bird migration there are, in general, two schools of thought. One school feels that birds have no senses and no sources of stimuli different from those of other terrestrial vertebrates including man and that the navigational feats accomplished by birds must be explained on the development or combinations of these senses in a manner incomprehensible to the human mind. The second school feels that, although birds possess and use the senses and sources of stimuli common to other terrestrial vertebrates, there must be an additional source of stimuli and an additional sense to perceive such stimuli. The author of this paper belongs to the latter school and cites the precision of migration to oceanic islands and the "homing behavior" of birds transported artificially from their breeding locality as necessitating such an assumption. Perception of the lines of force in the earth's magnetic field is ruled out because of the variability in the earth's magnetic field from time to time. Instead the author raises the possibility of an orientation on the basis of the earth's rotation. The effective force of gravity (and its direction) on an object at or above the earth's surface is actually the resultant of two forces. The greater is the *force of Newtonian attraction* (the attraction between the earth and the object in direct proportion to the products of their masses and in indirect relation to the square of the distance between their centers) which is modified both in extent and direction by the *centrifugal force* due to the rotation of the earth. The closer the object (bird) is to either pole the less the centrifugal force becomes and the less the Newtonian attraction is modified by the centrifugal force; the weight of the object (effective force of gravity) then becomes greater. Relative movement in the direction of the rotation of the earth increases (however, very slightly) the centrifugal force and slightly decreases weight; relative movement against the rotation of the earth neutralizes to a small degree the centrifugal force and increases weight slightly and changes slightly the direction of the effective force of gravity. The author presents a series of calculations indicating the possible effect of the earth's rotation on the fluids (such as those of the inner ear) in the bird's body and how this could give a *sense of latitude* as well as a *sense of direction*. He is inclined, to a certain extent, to doubt the necessity of assuming a special sense for detecting specific localities (Ortssinn). The theory presented in this paper is interesting and has considerable merit. Whether the relatively slight changes in extent and direction of the effective force of gravity can produce the effects detectable by the sense organs and nervous system of the bird is of course conjectural. As the author himself indicates, the theory must be subjected to experimentation.—D. S. F.

6. Minimum Intensities of Illumination under which Owls Can Find Dead Prey by Sight. Lee R. Dice. 1945. *American Naturalist*, 79: 385-416. Experiments were conducted with a Barred Owl, *Strix varia* Barton; Long-eared Owl, *Asio otus wilsonianus* (Lesson); Barn Owl, *Tyto alba pratincola* (Bonaparte); and two Burrowing Owls, *Speotyto cunicularia hypugaea* (Bonaparte); they found their prey "mostly by sight and there was no evidence of their employment for this purpose of infra-red rays or of any senses other than sight and physical contact." The first three species are able "to see and approach dead prey directly from a distance of six feet or more under an illumination calculated to be as low as 0.000,000,73 foot-candle." "The burrowing owl was unable to find dead prey regularly under illuminations dimmer than about 0.000,026 foot-candle." —M. M. NICE.

FLIGHT

7. Notes on Some Birds Observed in the Orange Free State and Records of Flight Speed. A. van der Plaat. 1946. *The Ostrich*, 17(3): 177-180. Of particular interest are the records of flight speed: Cape Vulture, *Gyps coprotheres* (J. R. Forster), soaring parallel to road, 42 miles per hour; Red Bishop Bird, *Pyromelana orix orix* (Linnaeus), fleeing before automobile, 40 m.p.h.; Red-faced Coly, *Urocolius indicus transvaalensis* (Roberts), fleeing before automobile, 46 m.p.h.; Marshall's Seed Eater, *Serinops flaviventris marshalli* (Shelley), 48 m.p.h.; Laughing Dove, *Stigmatopelia senegalensis aequatorialis* (Erlanger), flying parallel to automobile, 42 m.p.h.; Cape Turtle Dove, *Streptopelia capicola capicola* (Sundevall), fleeing before automobile, 50 m.p.h.; European Swallow, *Hirundo rustica* Linnaeus, in flight hunting for insects, 30-36 m.p.h.—D. S. F.

8. "Artificial Birds" as a Means for the Study of Bird Flight. (Ueber "künstliche Vögel" als Mittel zum Studium des Vogelflugs.) Erich von Holst. 1943. *Journal für Ornithologie*, 91(4): 406-447. This paper contains a description of an ingenious device which flies by wing flapping. Directions are given for its construction and aerodynamic problems concerning it and bird flight are discussed.—D. S. F.

BEHAVIOR

(See also Number 16.)

9. Sun-Bathing by Birds. John Gibbs. 1947. *British Birds*, 40(6): 172-174. Compilation of observations of ten men on sun bathing in thirteen passerine species, also the Nightjar, *Caprimulgus europaeus europaeus* Linnaeus; two Owls; Black Kite, *Milvus migrans* (Boddaert); and Wood Pigeon, *Columba palumbus palumbus* Linnaeus, with details as to posture in many cases. Seven species exposed their backs to the sun, four faced the sun, two did both. Juvenile birds seem to be particularly prone to sun-bathing. It is suggested that "sun-bathing in birds might be linked with the metabolism of vitamin D," but this is questioned by the editors.—M. M. NICE.

10. Bioelectronic Observations (V). Irradiation, Vitamin D, Preening, and Anting. Leon Kelso. 1946. Biological Leaflet No. 35. (1370 Taylor Street, N. W., Washington, D. C.) Suggests that the "spreading of oil on the feathers is for the function of irradiation and vitamin development and later ingestion, also offers an explanation for 'anting,' the occasional smearing of the feathers with ant exudations, vegetable juices, or other organic matter."—M. M. NICE.

11. Behaviour of Young Carrion Crow with Ants. W. Condry. 1947. *British Birds*, 40(4): 114. A hand-raised *Corvus corone corone* Linnaeus, not yet able to fly, at his first sight of an ants' nest stepped into it and "went through the motions of flicking the ants onto his back," he then "slowly settled down among the ants like a brooding hen, with wings outspread and tail fanned." Later at nests of other species, "he would lie flat among the insects, alternately putting ants onto his back with his beak and gobbling ants' 'eggs.'"—M. M. Nice.

12. "Injury-Feigning" of Blackbird. F. M. Firth. 1947. *British Birds*, 40(5): 147. A male *Turdus merula merula* Linnaeus was feeding young in the nest, when a cat appeared beneath the nest bush; "immmediately, the cock fell to the ground and fluttered 'helplessly' away across the grass, keeping at times only an inch or two from the cat, which occasionally made a short unsuccessful spring at the bird. This fluttering chase went on for about twenty yards . . . until finally the cat was led nearly six feet up the trunk of an apple tree."—M. M. Nice.

13. Observations in a Rookery during the Incubation Period. C. M. Ogilvie. 1947. *British Birds*, 40(5): 135-139. Eight nests of *Corvus frugilegus* Linnaeus were watched constantly from 10:30 a.m. to 6:45 p.m. 25 March 1946; incubation was performed by the females that left only after being fed by the males; each of the latter visited his nest from three to twelve times an hour with food. Coition took place on the nest; it "was more often promiscuous than between mated pairs and took the form of an assault resisted by the hen and countered by other cocks." An unmated male was the main offender. Mr. Tucker suggests that the resistant behavior of the female stimulates the attacks by other males, as in Jackdaws that "react in defence of fellow members of the colony which are in danger or difficulties."—M. M. Nice.

14. Display in the Masked Duck. V. N. Serventy. 1946. *The Emu*, 45(4): 319-321. This is a brief description of courtship display by the male *Biziura lobata* (Shaw). "The female appeared out of the paper-barks, and the male then began to fan the tail, at the same time keeping it parallel to the water. The head was pushed back on the shoulders, and the wattle began to protrude. It had a peculiar ribbed appearance, and was quite stiff-looking in contrast to its usual flabby condition. The tail began to be pushed more and more vertically till finally it was almost touching the back. The undertail covers at the same time were fluffed out into a round ball, very similar to a pin-cushion, when seen from a distance. The spine-like feathers were now widely separated. At the conclusion, a peculiar 'honking' call was given. As the display approached its emotional peak, a whistle followed the 'honking' call." (p. 319.) The author points out that contrary to Mayr and Delacour (*Wilson Bulletin*, 57(1): 3-55. 1945) the display of this species is not like that of the Oxyurae.—D. S. F.

15. Display of the Mute Swan. J. S. Huxley. 1947. *British Birds*, 40(5): 130-134. Detailed notes on display and reproductive behavior of *Cygnus olor* (Gmelin).—M. M. Nice.

LIFE HISTORY

(See also Number 13.)

16. At the Nest of a Barn Swallow. (Auprès du Nid d'Hirondelle *Hirundo rustica rustica* Linné.) L. De Braey. 1946. *Le Gerfaut*, 36(3): 133-198. This is a careful, detailed study of a nesting on a terrace in Antwerp, with many references to the observations of other investigators. Building lasted eight days

(May 16-23, July 17-24) and was performed by both parents; incubation lasted 14 days and was by the female; the male guarded the nest, driving off a strange male, his own young of the first brood during the second incubation, and also driving or enticing his mate back to the nest. (R. E. and W. H. Moreau, 1939, *British Birds*, 33: 146, reported a male of this species incubating two-fifths of the time.) Five all-day observations of incubation during the second nesting were made and are depicted in two sets of excellent graphs and a table. I have arranged the days according to temperature, rather than chronologically; in the third line I have calculated the percentage of time spent on the nest from the first departure to the last return, rather than from sunrise to sunset as did the author; the last line gives the total number of minutes each day on which the percentage is based.

Day of incubation	8th	10th	6th	13th	4th
Temperature	14.8° C.	17.4° C.	17.5° C.	20.2° C.	21.7° C.
Percent time on nest	74.0	73.9	72.9	63.9	66.5
Average length of periods on	7.2	8.5	8.3	8.4	11.9
Average length of periods off	2.5	3.0	3.0	3.8	5.8
Number of periods off	79	70	67	64	46
Total minutes	762	801	752	773	803

The average length of periods on and off the nest increases with increasing temperature, while the number of periods off the nest and the percentage of total time spent on the nest decreases. These results agree with the 29 days of Song Sparrow incubation taken with potentiometer by Baldwin and Kendeigh (Nice '37: 125).

During incubation the female started her day about 1½ hours after sunrise and ended about 40 minutes before sunset; after the three young hatched, however, feeding began about sunrise and ended about sunset. Three all-day observations were made: at 6 days, 396 meals, 27.5 per hour; at 11 days, 479 meals, 33.8 per hour; at 16 days, 514 meals, 37.1 per hour. The smallest record for one hour was three feedings, the largest three young, 16 days old, 59; five young, 17 days old, 70; 18 days, 73.

Daily weights are given for the young; at ten days they reached 18 grams, at 14 days 22.5 grams, but dropped to 18.5 grams at fledging at 22 days. For five days the young were fed as they perched on the telegraph wire near the house; they begged of every swallow that approached; after that they were fed on the wing and at times two begged from each other. An admirable contribution, particularly to our knowledge of incubation rhythm.—M. M. Nice.

OOLOGY

17. Polymorphism in Bird Eggs. (Polymorphisme des oeufs d'Oiseaux.) R. D. Etchécopar. 1942. *L'Oiseaux et la Revue Française d'Ornithologie*, 12(2/3/4): 121-132. Study and discussion of polymorphism in bird eggs is complicated by the difficulty in distinguishing anomalies from polymorphism and variations from polymorphism. "It is necessary to avoid generalizations which risk being arbitrary. It is possible nevertheless to acknowledge certain principles: (a) In order that there may be the possibility of polymorphism it is necessary that there be a high degree of homogeneity in each clutch (weight, size, color, and quality of shell) . . . (b) Likewise even if the clutch is homogeneous, it is necessary in addition that it show the greater part of the known specific characteristics and that the variation observed show only in one single characteristic (size, color, or form)." (p. 124.) The author lists and discusses briefly several European species with egg polymorphism. There are remarks concerning egg polymorphism in relation to evolution and systematics.—D. S. F.

ECOLOGY

(See Numbers 18, 19, 20, 24, 25, 32, 44, 45, 52.)

CONSERVATION AND WILDLIFE MANAGEMENT

(See Numbers 18, 22, 25, 26, 27, 52, 54.)

AVIFAUNAL DYNAMICS

(See also Numbers 33, 34, 46.)

18. The Nature of the Recent Changes in the Avifauna of Central and Northern Europe. (Zur Charakteristik der neuzeitlichen Veränderungen in der Vogelfauna Mittel- und Nordeuropas.) Olavi Kalela. 1946. *Ornis Fennica*, 13(3): 77-98. This is a very interesting and enlightening discussion of the changes in the avifauna, particularly the distributional ranges of species, in central and northern Europe. Two sets of factors are important: (1) *Climatic factors* associated with the change to warmer winters which has been progressing since the middle of the nineteenth century and the more recent development of warmer summers, particularly May and June, which began about 1920. (2) *Cultural factors* including agricultural and forestry practices, drainage of marshes, and many others. Often it is difficult to ascertain whether a given avifaunal change has been due to cultural or climatic influences. The changes in climate described above have in general allowed a northward extension of the ranges of southern species and a northward recession of the southern boundaries of the ranges of northern species. In the Kokemäenjoki River region of southern Finland, which the author has studied intensively, 11 of the 25 southern species occurring there as breeding species have come there since the middle of the nineteenth century, mostly since 1880-1890. In this region there has been a marked increase in mean annual temperature since the 1860's due to warmer temperatures in winter, spring, and late fall. Late spring and summer until about 1920 remained constant or were slightly lower than average. The intrusive southern species were in general permanent residents or migrants which breed early, species which would logically respond to warmer conditions in winter and early spring. Also among the southern species were four whose ranges have receded towards the south. These are the Golden Oriole, *Oriolus oriolus* (Linnaeus); the Spotted Crake, *Porzana porzana* (Linnaeus); the Corncrake, *Crex crex* (Linnaeus); and the Quail, *Coturnix coturnix* (Linnaeus). All of these are late arrivals in spring and late breeders and hence would not enjoy the benefits of the warmer winters and early spring. Actually June was on the average cooler until 1930. The avifaunal changes in Germany and generally in central Europe are more difficult to interpret because the changes in temperature have been less pronounced whereas the cultural factors have been more intense and varied. Of 32 southern species in Germany only six have extended their ranges northward whereas 14 have receded southward. The difference in mean annual temperatures between the periods 1859-1900 and 1901-1930 is about 0.2° C. in Germany whereas it is 0.4-0.5° C. in southern Finland. In general the summers in Germany and Austria have been slightly cooler since 1900 whereas the winters have been warmer. As in northern Europe, so also in central Europe the species which have expanded northward are those which would be expected to respond to the warmer winters and springs, *i.e.* those which are permanent residents or early migrants and breeders. With the exception of four species, those whose ranges have receded are migrants which breed in May or June and for whom the cooler summers (more pronounced in Germany than in Finland) would be adverse. This, however, must always be considered together with the more intensive cultural factors in central Europe. Since 1920, both in central and northern Europe, there has been an increase in mean temperatures for May and June which resulted in a new wave of intrusion of southern species into Finland.

Included are the Scarlet Grosbeak, *Carpodacus erythrinus* (Pallas); Red Breasted Flycatcher, *Muscicapa parva* Bechstein; the Grasshopper Warbler, *Locustella naevia* (Boddaert); the Great Reed Warbler, *Acrocephalus arundinaceus* (Linnaeus); the Reed Warbler, *Acrocephalus scirpaceus* (Hermann); the Marsh Warbler, *Acrocephalus palustris* (Bechstein); Blyth's Reed Warbler, *Acrocephalus dumetorum* Blyth; the Willow Warbler, *Phylloscopus trochiloides* (Linnaeus); the Barred Warbler, *Sylvia nisoria* (Bechstein); and the Thrush-Nightingale, *Luscinia luscinia* (Linnaeus). These are all late breeders whose appearance is correlated with warmer summers. The warmer summers in Germany have not been generally reflected as yet in recorded avifaunal changes (as in Niethammer's *Handbuch der deutschen Vogelkunde*, 1937-1942) although there are several examples of apparent northward range expansion or increase in numbers in Germany. The author points out that apparently small birds respond more quickly to climatic changes than do larger species due, in part at least, to the fact that most small birds breed during the first year of life and to their generally higher population densities.—D. S. F.

19. The Distributional History of the Birds of the Eutrophic Lakes. (Zur Ausbreitungsgeschichte der Vögel vegetationsreicher Seen.) Olavi Kalela. 1946. *Annales Academiae Scientiarum Fennicae*, Series A, IV, *Biologica* 12. 81 pp. This is another of the author's able treatises in the field of avifaunal dynamics. Among the more spectacular changes in distribution in recent decades in northern Europe, and to a lesser extent in central Europe, have been those involving birds characteristic of the eutrophic lakes. Included in this group are several species of grebes, pelicans, ducks, geese, harriers, rails, coots, gulls, terns, and reed warblers. A thorough comprehension of these expansion phenomena requires consideration of the length of period of expansion and the direction of expansion. Two types of expansions are recognized: (1) *Colony type*, typified by the expansion of the Mute Swan, *Cygnus olor* (Gmelin) in Sweden, in which the most favorable biotopes are first occupied followed by gradual peripheral expansion into less favorable areas. (2) *Invasion type*, exemplified by the expansion of the Black-necked Grebe, *Colymbus nigricollis* (Brehm), into central and north-central Europe and the expansion of the Little Gull, *Larus minutus* Pallas, in which new populations are formed, and perhaps for some time maintained, by infiltration from a considerable distance. The second type seems to be the most common among the lake species. The principal expansion direction has been from south to north although there are important southeast-to-northwest and east-to-west components. For example, the Black-necked Grebe; the Mute Swan; Gadwall, *Chaulelasmus* [=*Anas*] *streperus* (Linnaeus); Red-crested Pochard, *Netta rufina* (Pallas); Pochard, *Nyroca* [=*Aythya*] *ferina* (Linnaeus); and the Little Gull show themselves definitely to be invaders from the east or southeast. Much of the invasion by these lake birds began between 1890-1900 and 1930. However, the expansions of the Great Reed Warbler, *Acrocephalus arundinaceus* (Linnaeus); the Reed Warbler, *Acrocephalus scirpaceus* (Hermann); and the Red-crested Pochard belong to a wave of invasions which has developed since 1930. The motivating factors in range expansion are divided into cultural influences and changes in climate. [See preceding review.] Most fundamental in the cases of the lake birds appears to be the increase in temperature and accompanying aridity. Increased aridity in the original breeding areas in southwestern Asia and southeastern Europe apparently motivates expansion whereas increased temperature in the invaded areas allows the expanded range in central and northern Europe to be established and maintained. The steppe areas with their numerous lakes have probably been the expansion center from which these species have taken over new areas to the north and west. Much attention in this paper is devoted to the historical aspects of the distribution of the lake species with evidence derived from many sources. During the Pliocene when the present genera and many of the present species of birds

were evolved, the southern part of the Palearctic region contained a continuous belt of dry steppe region. The distribution of the lake species has changed with the expansion, recession, enlargement, and diminution of the steppe areas in consequence of the subsequent Pleistocene glaciation. During southward movement of the continental ice mass and the accompanying increase in rainfall the steppes and hence the distributional areas of the lake species doubtless were pushed southward and condensed. This tended to divide the steppe areas into two centers, the Caspian and the less important Manchurian. Northward movement and expansion of the steppes, which at times covered much of Europe, and consequently of the distributions of the lake species occurred during interglacial periods. During glacial periods the distribution areas were probably restricted principally to the Caspian Sea area and to the adjacent western Asiatic and Mediterranean (North African) areas and further eastward to the similar area in Manchuria. In considering the recent range expansion of these lake species the author raises the question as to whether this represents postglacial expansion suddenly accelerated under favorable conditions or part of the series of expansions associated with interglacial and post glacial climatic changes. A careful consideration of evidence from many sources including pollen studies leads the author to conclude that the scheme of climatic changes observed in the present fluctuations carries over into the entire picture of postglacial climate development. Increased temperatures and increased rainfall in the higher latitudes correspond to increased aridity in the lower latitudes. There is infallible evidence from fossils that the postglacial warm period (probably 5000 B.C. to 1000 B.C.) was accompanied by an extensive expansion of the lake species in Europe. The consequent development of a more unfavorable climate then caused a recession in range southward and eastward. "As the next counterpart of the postglacial warm era comes without doubt the maxima of the 1920's and above all of the 1930's of the present climate cycle." (pp. 69-70.) Presumably the present expansion of the lake birds corresponds with that of the postglacial warm period; presumably the last two thousand years represent a change, with oscillations to be sure, towards conditions again favorable to northward expansion. The present expansion is from the steppe regions into the deciduous forest regions which are regionally and climatically next to the steppes. Some of the invading species are well adapted and multiply in the deciduous forest regions. The less adapted apparently maintain the populations in deciduous forest areas by constant additions from outside the area. This paper, like the others produced by this author, is important not only for its intrinsic value but also because it represents a method of avifaunal study which utilizes ecologic, historic, and dynamic climatologic sources in an integrated manner.—D. S. F.

20. New Records of the Marsh Warbler in Finland with Some Remarks Concerning its Range Expansion in Recent Years. (Neue Funde des Sumpfrohrsängers, *Acrocephalus palustris* (Bechst.), in Finnland nebst einigen Bemerkungen zu seiner Ausbreitung in jüngster Zeit.) Olavi Leivo. 1946. *Ornis Fennica*, 23(3): 65-77. In the summer of 1944 the author recorded the first two occurrences of *Acrocephalus palustris* (Bechstein) in Finland (*Ornis Fennica*, 22: 5-10. 1945). These two records from the vicinity of Helsinki are now followed by four records for the summer of 1945 as presented in this paper. It is presumed that the Finnish birds have come from Estonia where the species has long been common but where there has perhaps been an increase in recent years. The appearance of this species in Finland is a part of a large picture of avifaunal change which can be correlated with gradual, but nevertheless profound, changes in climate. This change began in the latter part of the nineteenth century with increased mean temperatures in the months of winter and spring. This change in climate has been accompanied by range expansion of many southern species into Finland. This expansion stagnated in many species after the turn of the century but began anew about 1935 when the spring temperature means reached their

maxima. Along with the advance of southern species there has been a recession of northern species and a more northern wintering in others. The expansion of the Marsh Warbler did not begin until during the 1930's (earlier in Sweden than in Finland) contrary to the situation in many other species. This is accounted for by the fact that the Marsh Warbler is a late migrant and breeder and that it was not until after 1930 that both the May and June temperature means became simultaneously high. The author suggests that the higher May temperatures caused prolonged northward migration and that the higher June temperatures insured reproductive success. No significant increase in population to force this expansion could be detected by the author in his examination of the literature. However, he suggests that a normal population fluctuation coupled with the stimulus of favorable weather might have produced adequate prolonged northward migration to establish the range expansion. Several other passerine species have shown a similar pattern of expansion towards the north and northwest. The Marsh Warbler has also appeared in Sweden since the turn of the century. The circumstances appear to be similar to those in Finland although doubtless the Swedish birds came from Denmark into Skåne and from Skåne into Halland. The range expansion into Finland appears to have been to date more extensive and better established.—D. S. F.

21. The Range Expansion of the Collared Turtle Dove in Hungary in the Last Decade. (A balkáni kacagógerle térhóditása magyarországon az utolsó évtizedben.) Andreas Keve-Kleiner. 1944. *Aquila*, 1943: 264-281. (German translation, 281-298.) *Streptopelia decaocto decaocto* (Frivaldszky) apparently came into Europe *via* Constantinople. It had not been recorded at Sophia in Bulgaria by 1903. This species was first recorded from Hungary in 1932, the first records being from the central part of the country. There were seven records by the end of 1935 and by the end of 1942 there were 86 records. The author suggests that this species has its origin in India from which its explosive expansion in range occurred in three or possibly four directions: (1) eastward into Burma; (2) possibly northeastward through Assam, China, to Japan and the Amur region; (3) northward through the Indus River Valley into the plain of Turkestan from whence it turned westward; (4) westward *via* Iran, Iraq, the Levant Coast, the northern Balkans, Hungary, and the Vienna basin. Measurements do not support Reinig's hypothesis of alele diminution but rather support Bergmann's rule since the Japanese and Hungarian specimens are the largest. Also they do not support the theory of undirected mutation of Timoféeff-Ressovsky.—D. S. F.

22. The Recent Immigration of the Cormorant into Denmark. (Skarvens *(Phalacrocorax carbo sinensis* Shaw & Nodder) Nyindvadring til Denmark.) Harry Madsen. 1946. *Dansk Ornithologisk Forenings Tidsskrift*, 40(1): 1-13. Formerly this was a common breeding species in Denmark. However, due to ruthless persecution, it disappeared as a breeding species before 1900. In 1937 50 cormorants appeared on the Island of Langeland but did not breed; however, in 1938 there were 14 nests. Thereafter the colony increased, 24 pairs in 1940, about 100 in 1943, and 400 in 1944 and 1945. After visits by the birds in 1941, 1942, and 1943 the islet of Vors in 1944 had 50 breeding pairs and 233 in 1945.—D. S. F.

23. "Elimination" or Selection in the Range Expansion of the Serin? ("Elimination" oder Selektion bei der Girlitzausbreitung?) B. Rensch. 1941. *Ornithologische Monatsberichte*, 49 (4/5): 94-104. The expansion of *Serinus canaria serinus* (Linnaeus) from the Mediterranean Area northward into central Europe since 1800 has been studied and described in considerable detail by Mayr *(Journal für Ornithologie*, 74: 571-671. 1926). The author presents in this paper data on measurements taken from skins from the various parts of the present range. The wing and tail measurements are larger for the males of the Balkan-

Asia Minor population than for the males of the Italo-Spanish population. These differences are attributed to selection on the basis of Bergmann's Rule (larger races in cooler climate). In the newly colonized areas of central Europe the Serin does not show a decrease in size which should be expected on the basis of Reinig's hypothesis of *alele diminution* in which case there should be decreases in size on the periphery of the distributional area of a species or race. On the other hand the increase in size which would be expected under Bergmann's Rule does not exist; perhaps there has not been ample time for selection on this basis. There is, in the German birds, a slight tendency towards a more pointed wing in accordance with Rensch's Rule (a migratory race or population in cooler areas has more pointed wings than a non-migratory race or population in a warmer area).—D. S. F.

24. Avifaunal Analysis and Its Terminology. (Den avifaunistiske Analyse og dens Terminologi.) Finn Salomonsen. 1946. *Dansk Ornithologisk Forenings Tidsskrift*, 40(1): 13-49. This paper is devoted principally to considerations involved in a thorough avifaunal analysis with considerable attention to the terminology involved therein. The breeding birds of an area are called the *nidiates* (Nidiater). The nidiates may be classified as *summer residents* (Ynglefraekfugle), populations which leave the breeding area during the unfavorable part of the year; *dispersal residents* (Ynglestrejfugle), populations which disperse in an indefinite manner in all directions, *residents* (Ynglestandfugle), populations which remain in or near the breeding area throughout the year; *irrupting residents* (Invasionsfugle), populations which undertake irregular movements in certain years, a group not precisely comparable with the other three groups. Nidiates may also be classified according to the season in which breeding occurs: *spring breeders* (Foraarsrugere, *summer breeders* (Sommerrugere), *autumn breeders* (Efteraarsrugere), and even *winter breeders* (Vinterrugere). They may also be classified, especially in tropics or subtropics, as *dry season breeders* (Tortidsrugere), *rainy season breeders* (Regnitidsrugere), or *year around breeders* (Aarsrugere). *Immature migrants* (Ungetraekfugle) are populations in which the adult birds are residents and the young are migrants and *immature dispersal migrants* (Ungestrejfugle) are populations in which the young undertake dispersal movements whereas the adults are residents. *Preliminary migrants* (Mellemstraekfugle) are populations in which young birds in the first autumn undertake preliminary migration before the real migration; if the movement is more of a dispersal the population can be called *preliminary dispersal migrants* (Mellemstrejfugle). *Weather migrants* (Vejrfugle) are those populations whose migratory movements are determined by meteorologic conditions. *Instinct migrants* (Instinktfugle) are those populations whose migration pattern is determined by fundamental physiologic cycles.

Annuates are populations which occur regularly (annually) in a given area without breeding. (1) Among the *winter visitors* (Vintergaester) are *northern winter visitors* (Nordvintergaester) from areas farther north, *southern winter visitors* (Sydvintergaester) from areas farther south, *dry season visitors* (Tortidsgaester) (applicable particularly in the tropics and subtropics), *rainy season visitors* (Regnitidsgaester) (also applicable particularly in the tropics and subtropics), *drift winter visitors* (Driftvintergaester) which are visiting populations far from the normal winter area. In contrast to *winter visitors* are the (2) *migrant visitors* which occur in the area only during spring and/or fall migration. These include the *spring-migrant visitors* (Foraarstraekgaester) and sometimes *winter-migrant visitors* (Vintertraekgaester) and *summer migrant visitors* (Sommertraekgaester). Also among the migrant visitors are *immature-migrant visitors* (Ungetraekgaester) which visit the area only during their first year, *preliminary-migrant visitors* (Mellemstraekgaester) which occur during the post-breeding season preliminary migratory movements of the population, *dispersal visitors* (Strejfgaester). In contrast to the genuine *migrant visitors* are the *drift visitors* which are driven into the

area irregularly by peculiar weather conditions. (3) *Summer visitors* are non-breeding populations or portions of populations occurring in the area during the summer. These include *immature summer visitors* (Juvenalsommergaester) which are young non-breeding birds which spend the summer south of the breeding area of the population, *adult summer visitors* (Adultsommergaester) which are non-breeding adults which spend the summer in an area south of the breeding area, *stray summer visitors* (Forflyvningsommergaester) which are individuals spending the summer north as a result of the "so-called prolonged migration," and *trans-equatorial summer visitors* (Transaekvatoriale Sommergaester) which "spend the winter in areas where it is summer during the period in question."

Accidates are "populations occurring only irregularly in the area, single individuals or flocks being recorded at intervals of several years." Two categories of *accidates* are recognized. (1) *Accidental visitors* (Tilfaeldige Gaester) are those that occur as single birds or small flocks at intervals of many years; several subdivisions such as *accidental breeding visitors* (Ynglegaester), *accidental drift visitors* (Tilfaeldige Driftgaester), and *variation visitors* (Misvisningsgaester) so-called because "the appearance of these visitors is no doubt due to failing sense of direction." There are several groups of *irrupting visitors* (Invasionsgaester) depending on the cause of the irruption. *Fructivorous irrupting visitors* (Fructivore Invasionsgaester) are boreal species feeding on berries and fruit which carry on invasions in years of failure of their food plants, *murivorous irrupting visitors* (Murivore Invasionsgaester) are boreal species which invade southward in years following maxima in rodent populations. *Locustivorous irrupting visitors* (Locustivore Invasionsgaester) are species of the steppes or savannahs which feed on locusts and invade areas in search of this source of food. *Glacial irrupting visitors* (Glaciale Invasionsgaester) are species which winter ordinarily in the Arctic but push southward in years of adverse ice conditions. *Drought irrupting visitors* (Tørke Invasionsgaester) are species whose invasions are caused by dry conditions. Occasional breeders among these groups are known as *irrupting breeding visitors* (Invasionsfugle som Ynglegaester). *Drift irrupting visitors* (Driftinvasionsgaester) are species "which on account of adverse conditions get into a drift and in this undertake irrupts." Irrupting visitors can be classified as to the season of the invasion. Species which move about breeding wherever conditions are suitable are designated as *nomadic breeding visitors* (Nomadeynglegaester). While not denying the existence of these various classes of occurrence among birds, it seems that the author is proposing to distinguish them by a jargon which is not only cumbersome but unnecessary. This is an important and interesting paper. Beyond the proposal of a system of nomenclature is the indication of things to be learned about the avifauna of a region. Many of the data can be obtained with reliability only by investigations using banding.—D. S. F.

25. Inhabitants of the Northeast Polder, Sixth Report, the Breeding Seasons of 1944 and 1945. (Noordoostpolderbewoners, 6e bericht; broedseizoenen 1944 en 1945.) J. H. Muller. 1946. *Limosa*, 18(2-4): 25-48. The Northeast Polder, an irregularly shaped area about 25 kilometers long and about of the same width, was reclaimed from the Zuider Zee by drainage in 1941. This paper is based on an invaluable series of observations, begun in 1942, on the colonization of the area by birds. During the first few years there was extensive colonization by shore birds including the Little Ringed Plover, *Charadrius dubius curonicus* Gmelin; Avocet, *Recurvirostra avosetta* Linnaeus; Ringed Plover, *Charadrius hiaticula hiaticula* Linnaeus; and Kentish Plover, *Charadrius alexandrinus alexandrinus* Linnaeus. Colonization by the Lapwing, *Vanellus vanellus* (Linnaeus) was peripheral. In 1944 there were only 180 square kilometers under cultivation and much of the area had become covered by growth of *Phragmites*, *Scirpus*, and *Typha*. In 1944 several species had become numerous breeding inhabitants. There were the Blue-headed Wagtail, *Motacilla flava flava* Linnaeus; the Reed Bunting,

Emberiza schoeniclus schoeniclus (Linnaeus); and Reed Warbler, *Acrocephalus scirpaceus scirpaceus* (Hermann). It is estimated that a thousand pairs of each may have inhabited the area. Species which occurred in "moderate numbers" (100-300 pairs) in the summer of 1944 were the Crested Lark, *Galerida cristata cristata* (Linnaeus); Swallow, *Hirundo rustica rustica* Linnaeus; Little Ringed Plover; Lapwing; Avocet; and the Quail, *Coturnix coturnix coturnix* (Linnaeus). In smaller numbers (10-50) were the Ringed Plover; Great Reed Warbler, *Acrocephalus arundinaceus arundinaceus* (Linnaeus); Sedge-Warbler, *Acrocephalus schoenobaenus* (Linnaeus); Marsh-Warbler, *Acrocephalus palustris* (Bechstein); Savi's Warbler, *Locustella lusciniodes lusciniodes* (Savi); and the Short-eared Owl, *Asio flammeus flammeus* (Pontoppidan). In the author's opinion, concerning the species listed above, there was an abundance of available biotopes. For those in the last two groups, presumably another reason for failure to colonize the area completely must be sought. [This could be the absence of population pressure in the surrounding areas, to a highly developed tendency of the species to return to the birthplace as breeding birds, or perhaps to undetected environmental deficiencies.] The author believes that colonization by the Oystercatcher, *Haematopus ostralegus ostralegus* Linnaeus, and by the Redshank, *Tringa totanus totanus* (Linnaeus) was definitely limited by absence of suitable biotopes. Colonizing individuals in several species arrived in the area at the time of maximum migration of the species. Among these are the Reed Bunting, Blue-headed Wagtail, Sedge-Warbler, Ringed Plover, Kentish Plover, and Avocet. Several others arrived in the area near the end of the migratory period of the species. Included in this group are the Great Reed-Warbler, Reed-Warbler, and Marsh-Warbler. [This may indicate colonization by first-year birds.]—D. S. F.

26. The Quail in Early Wisconsin. A. W. Schorger. 1946. *Transactions of the Wisconsin Academy of Sciences, Arts and Letters*, 37: 77-103. This is another of Dr. Schorger's important treatises of the original ranges of Wisconsin birds. The original range of *Colinus virginianus virginianus* (Linnaeus) in Wisconsin included approximately the entire southern half of the state, or the area south of a line extending from the southern tip of Green Bay to central St. Croix County (about the latitude of St. Paul, Minnesota). Quail became abundant about 1846 in southern Wisconsin and for several years were an important item of commerce. "There is little doubt that the habit of quail to emigrate or irrupt, when a certain density of population was attained, was a powerful factor in producing the huge numbers that existed in Wisconsin in the decade prior to 1854." This abundance was followed, beginning about 1854, by a decline due to a "combination of trapping and adverse weather." The advent of agriculture created early an optimum ratio of wild to cultivated land which allowed the quail to increase in number. More intensive agriculture, however, has reduced cover with a consequent decline of the species.—D. S. F.

27. Is the Common Curlew in the Process of Becoming Extinct? (Ist *Numenius arquatus* in Aussterben begriffen?) E. Stresemann and H. Grote. 1943. *Ornithologische Monatsberichte*, 51(5/6): 122-127. It seems possible that *Numenius arquata* (Linnaeus), or at least the portion of its population which breeds in northern European Russia, may be undergoing a fate similar to that of the Eskimo Curlew, *Numenius borealis* (J. R. Forster). It is possible that hunting pressure in the wintering area may be the causative factor.—D. S. F.

28. The Mangrove Warbler—Extension in Range. K. A. Hindwood. 1946. *The Emu*, 45(4): 311-314. This is a report of the occurrence of *Gerygone levigaster cantator* (Weatherill), near Macksville, Nambucca River, New South Wales. This is a remarkable extension in range. One naturally wonders if this

is a true range extension comparable to the northward expansion of certain North American and European species or whether the species has merely been overlooked previously in this area.—D. S. F.

GEOGRAPHIC DISTRIBUTION AND ZOOGEOGRAPHY

(See also Numbers 19 and 46.)

29. Species of Birds Added to the Kansas Faunal List since 1900, with Reference to the First Record. Arthur L. Goodrich. 1947. *Transactions of the Kansas Academy of Science*, 49(4): 420-432. This paper lists the additions to the list of Kansas birds since 1900, giving the first reference in the literature in each case. Thus 98 species and subspecies are listed. It is noted that the author does not accept the synonymy of the Red-legged Black Duck and the Common Black Duck, *Anas rubripes rubripes* Brewster and *Anas rubripes tristis* Brewster, listing the former as an addition to the list.—D. S. F.

30. Birds of the Orland Wildlife Refuge. C. Blair Coursen. 1947. Published as a 1947 supplement of *Turtox News*. (General Biological Supply House, 761-763 East 69th Place, Chicago 37, Illinois.) 30 pp. This is a list of 238 species which have been observed on this refuge of 975 acres. A paragraph under each species gives its status and records of its occurrence.—D. S. F.

31. Barrow's Golden-eye in Massachusetts. Ludlow Griscom. 1945. *The Auk*, 62(3): 401-405. The author points out some duplications and inconsistencies in the tabulation of data in Hasbrouck's paper (*The Auk*, 61: 544-554. 1944). Barrow's Golden-eye, *Glaucionetta islandica* (Gmelin) in Massachusetts seems to be a regular winter visitor in cold ocean regions with 'northern' invertebrate fauna. Some records by inexperienced observers are questioned since in the eclipse plumage the Barrow's is easily confused with the American Golden-eye.—E. P. Odum.

32. Observations of Birds and Mammals in Central British Columbia. J. A. Munro. 1947. *Occasional Papers of the British Columbia Provincial Museum*, No. 6: 1-165. 50 cents. This is the report of an investigation made during the summer of 1944 of the game-bird resources of the region. The topography and flora, chiefly of the lakes and marshes are described and illustrated by many excellent photographs. "Many waters in central British Columbia suited to waterfowl propagation have insignificant populations or are entirely devoid of waterfowl." (p. 43.) As to Loons, *Gavia immer* Brunnich, a "total of 42 adults succeeded in raising a total of nine young," (p. 46.) and 46 Holboell Grebes, *Colymbus grisegena* Boddaert, raised 16 young. On August 4 a female Baldpate, *Mareca americana* (Gmelin) and female Lesser Scaup, *Aythya affinis* (Eyton) each had four young; five days later the Scaup and the young Baldpates had disapperaed and the adult Baldpate had adopted the two remaining young Scaups, being "as assiduous in their defense . . . as she had been earlier in defense of her own young." (p. 57.) Much of interest is given on the mammals: cyclic rhythms of the voles are different in different localities (p. 108) and cycles of different species usually do not coincide in time. Moose have invaded the region in the last 60 years, and wolves have become more abundant recently.—M. M. Nice.

33. The English Sparrow in South America. (*Passer d. domesticus* in Sudamerika.) Erwin Gebhardt. 1944. *Ornithologische Monatsberichte*, 52(3/4): 95-98. This is a summary of the published records of the English Sparrow in South America.—D. S. F.

34. Winter Records of Starlings in Mexico. (*Sturnus vulgaris* L. als Wintergast in Mexico.) Helmuth Otto Wagner. 1941. *Ornithologische Monatsberichte*, 49(4/5): 143-144. The records include April 1935 (circumstances not clear); December 1938, two at Anaxhuac 50 kilometers east of the city of Nuevo Laredo; 24 December 1939 ten at Santa Lucia between Laredo and Monterey; 18 March 1940 between Laredo and San Antonio.—D. S. F.

35. Breeding Birds in Winter. C. H. Jerome. 1946. *The Ostrich*, 17(3): 191-193. The author records observations on breeding in Transvaal during the winter (June) of 1945 which was unusually severe. The species observed to have young were the Egyptian Goose, *Alopochen aegyptiacus* (Linnaeus); Spurwing Goose, *Plectropterus gambensis* (Linnaeus); and the Yellow-billed Duck, *Anas undulata undulata* Du Bois. Nests and eggs of the Coot, *Fulica cristata* Gmelin; White-breasted Cormorant, *Phalacrocorax lucidus* (Lichtenstein); Reed Cormorant, *Microcarbo africanus africanoides* (Smith); and the African Crested Grebe, *Podiceps infuscatus* Salvadori were found. An Orange-breasted Waxbill had taken over an old Bishop-bird nest and had laid two eggs.—D. S. F.

36. Notes on the Bird Life of Australia's Heaviest Rainfall Region. S. R. White. 1946. *The Emu*, 46(2): 81-122. These are observations made on the coast of North Queensland between Ingham and Mossman. The author's annotated list contains 174 species observed by him and 85 additional species recorded by previous observers.—D. S. F.

37. The White Fronted-Tern *(Sterna striata)* in Australia. K. A. Hindwood. 1946. *The Emu*, 45(3): 179-199. This is a detailed but interesting discussion of the distributional and breeding records of this species in Australia. There is also a discussion of the plumage.—D. S. F.

38. Field Notes on some New Guinea Birds. J. A. Tubb. 1945. *The Emu*, 44(4): 249-273. An annotated list of 128 species of birds, based on sight records, observed between February 1943 and February 1944 at North Torres Straits, Port Moresby area, Gili Gili, Aisi Aisi, Porlock Harbour, Oro Bay area, and Dobudura and environs. A table shows the comparative observations for these localities.—D. S. F.

39. The Banded Stilt. Jack Jones. 1945. *The Emu*, 45(1): 1-36. An interesting review of the available information on *Cladorhynchus leucocephalus* (Vieillot). Normally this species is distributed in Australia south of lat. 26° S. with greatest numbers south of lat. 29° S. It is a bird of the southern half of Australia. "Definite seasonal movements of the Banded Stilt are known to occur, the species arriving in southern coastal areas of South Australia and Western Australia in considerable numbers in early summer and departing to the interior in late autumn, few remaining in the coastal areas." (p. 34.) It is suggested that there are separate populations occurring in southwestern Western Australia and in eastern South Australia. Food appears to be aquatic insects, crustacea, and mollusks. The Banded Stilt can subsist either in fresh- or salt-water localities.—D. S. F.

40. The Banded Stilt. Jack Jones. 1945. *The Emu*, 45(2): 110-118. A list of plates and records supplementary to the paper of the same title, *The Emu*, 45(1): 1-36.—D. S. F.

41. Checklist of Swiss Birds. (Artliste der schweizerische Vögel.) Olivier Meylan and Werner Haller. 1946. *Die Vögel der Heimat*, 16(7): 131-179. This systematic list of Swiss birds contains 325 species. For each the complete scien-

tific name is given together with a common name in German and a brief statement of occurrence in Switzerland. The hypothetical list contains 29 species.—D. S. F.

42. Review of the Avifauna of the Ukraine and Crimea. (Uebersicht über die Vogelfauna der Ukraine und der Krim.) H. Grote. 1942. *Ornithologische Monatsberichte*, 50(6): 147-163. A brief treatise of the breeding birds, migrants, and winter visitants based primarily on the Russian literature.—D. S. F.

43. The Beginning of Spring in Attica. (Frühlingsanfang in Attika.) Erwin Stresemann. 1942. *Ornithologische Monatsberichte*, 50(2): 28-58. This paper is based on notes made between 19 March and 6 April 1942. There is an annotated list of 69 species and subspecies.—D. S. F.

44. Contributions to the Knowledge of the Breeding Birds of the Peloponessus. (Beiträge zur Kenntnis der Brutvögel des Peloponnes.) Günther Niethammer. 1943. *Journal für Ornithologie*, 91(2/3): 167-238. "Results of a biological expedition to the Peloponessus and Crete in 1942, conducted under commission of the high command of the Wehrmacht and the National Research Council." This is mostly an annotated list of 125 species and subspecies of breeding birds. Also there are ecologic, faunistic, and zoogeographic notes. The observations were made in April, May, and June of 1942.—D. S. F.

45. Contributions to the Ornithology of Crimea. (Beiträge zur Vogelkunde der Krim.) Heinrich Krätzig. 1943. *Journal für Ornithologie*, 91(2/3): 268-285. This paper is based on observations made by the author as a soldier in Crimea from 22 November, 1941 to 27 August, 1942. These are notes on the ecology of the region and an annotated list of 97 species and subspecies.—D. S. F.

SYSTEMATICS

46. On the History of the Distribution of the Genus Dendrocopos. K. H. Voous, Jr. 1947. *Limosa*, 20(1-3): 1-142. (English with Dutch summary). The goal of this doctoral thesis was "to determine whether historical influences upon distribution and taxonomy can be detected in the recent range of the genus *Dendrocopos*." Voous divides the 35 species of this genus (which is often called *Dryobates* and includes the American Hairy and Downy Woodpeckers) into six groups based on color pattern and other characters. He treats each group exhaustively, describing the species and subspecies, giving measurements and then seeking to determine which characters are stable and which progressive. On this foundation he then tries to trace the distribution of each of his main groups, especially in relation to the distribution of forests, present and past, and to the existence of "refugia" or areas of unglaciated forest into which these woodpeckers, along with other species, were driven during the successive glaciations. In the variable *Dendrocopos major* (Linnaeus) he finds groups of subspecies thought to correspond to the four glacial periods. The American Downy and Hairy Woodpeckers are said to divide into an eastern and a western group of subspecies which differentiated when these species retreated into unglaciated areas in southeastern and southwestern United States. Although the conclusions of Voous are usually plausible, one often feels that he is allowing speculation rather free rein. He lists Gondwana Island with a group of existing islands so casually that the uninitiated might seek it on a map (p. 115). Parallelism, so striking throughout the woodpecker family, and reversal of evolutionary trends probably explain some of the resemblances that Voous considers indicative of true relationship, such as the similarity in some respects of the Arizona Woodpecker to the Old World *Dendrocopos major* group.

This paper will be valuable to those studying a variety of problems, not the least to ecologists who often minimize the historical aspect of distribution.—D. AMADON.

47. The Timaliinae. (Les Timaliinés.) Jean Delacour. 1946. *L'Oiseau et la Revue Française d'Ornithologie*, 41: 7-36. A good classification of the Passeriformes (songbirds) is yet to be achieved; most efforts in this direction gloss over a great many genera of uncertain position. At the core of the difficulty is the great group of 1300 species of Old World flycatchers (Muscicapidae) and their allies: Timaliinae or babblers, Sylviinae or Old World Warblers, Turdinae or thrushes and others. The babblers are perhaps the most puzzling of these subgroups and have long served as a scrap basket for difficult genera. Delacour, in the latest of his major revisions, has reduced this chaotic group to order. The babblers are stocky, strong-legged, short-winged birds that live on the ground or in undergrowth. They are noisy active birds; some are fine songsters. Their young are not spotted like (most) thrushes or yellow like the young of the Sylviinae. After removing a number of misplaced genera from the Timaliinae, Delacour divides the group into five tribes. The characters and habits of each of these and of the included genera are briefly discussed. Two of the tribes occur in Africa and Asia, one in Asia and Madagascar, one in Asia and Australia while the fifth is chiefly Asiatic but included the European bearded tit *(Panurus)* and the California Wrentit *(Chamaea)*. The latter is scarcely separable generically from the Chinese *Chrysomma poecilotis* (J. Verreaux). This tribe contains the parrot-bills *(Paradoxornis)*, once placed in a separate family. Remarkable variation is shown by *Paradoxornis unicolor* (Hodgson) with four toes and *Paradoxornis paradoxus* (J. Verreaux) with three only; two forms so close they would otherwise be thought races of a single species. Finally, the 44 genera and 248 species recognized are listed. No fewer than 59 genera usually upheld are synonomized and the reduction in species is equally great. Whereas it is certain that there will be minor points where the specialist will disagree, Delacour's revision of the Timaliinae will be a blessing to everyone interested in these remarkable birds.—D. AMADON.

48. Hybridization of the Nightingale and the Thrush Nightingale. (Ueber die Bastardierung von *Luscinia luscinia* und *Luscinia megarhynchos.*) Rolf Nöhring. 1943. *Ornithologische Monatsberichte*, 51(1/2): 1-4. According to Rensch's differentiation between geographic races and species, the Nightingale and the Thrush Nightingale must, despite their slight morphologic differences, be regarded as separate species. That is the prevailing and accepted opinion today. However, because of the slight morphologic differences, hybrids would be apparent only with difficulty. In order to study hybridization the author placed a *megarhynchus* male and a *luscinia* female together in an enclosure. The resulting clutch of five eggs hatched. Unfortunately, the hybrid young escaped before the author was able to measure them for comparison with the two parent species.—D. S. F.

49. Variation in *Bonasa umbellus*, with Particular Reference to the Species in Canada East of the Rockies. L. L. Snyder and T. M. Shortt. 1946. *Canadian Journal of Research*, D. 24: 118-133. The authors have examined 624 specimens of Ruffed Grouse from eastern North America and agree with Aldrich and Friedmann (*Condor*, 45: 85-103. 1943) that, in measurements there seems to be no significant geographic variation. "Our procedure has been to compare corresponding colour phases of the various populations, largely from a dorsal view." Actually, because of numbers, gray-phase birds were used predominately with supporting evidence from the red-phase birds. The race *canescens* Todd is accepted as valid. This, with the consequent revision of some boundaries of races constitutes the principal diversion from the revision of Aldrich and Friedmann.—D. S. F.

EMBRYOLOGY AND DEVELOPMENT

50. The Post Embryonic Development of the Common Heron and its Comparative Biologic Significance. (Die postembryonale Entwicklung des Graureihers (*Ardea cinerea* L.) und ihre vergleichend-biologische Bedeutung.) Adolf Portmann. 1945. *Archives suisses d'Ornithologie*, 2(4): 181-184. The author gives growth curves for the Common Heron compared with the Roseate Pelican, *Pelecanus onocrotalus* L., and the Mute Swan, *Cygnus olor* Gmelin. Forty days after hatching adult weight is attained in the Common Heron; however, mean adult weight is not exceeded at any time during post embryonic development. In the Roseate Pelican, adult weight is attained at 40 days and until about 80 days is greater than adult weight. In the Mute Swan at 150 days after hatching weight is about 75 percent of mean adult weight.—D. S. F.

EVOLUTION

(See Numbers 23 and 26.)

BOOKS

51. A Field Guide to the Birds. Eastern Land and Water Birds. Second Revised Edition. Roger Tory Peterson. 1947. Houghton Mifflin Company. Boston. xxiv + 290 pp. $3.50. The second revised edition of this standard field guide represents an extensive expansion in size over the first revised edition. Its length has been increased by 110 pages; there are sixty plates, 36 in color, compared to 40 plates with four in color in the first revised edition. All illustrations are new; the black and white plates of the first revised edition have been in many instances replaced by color plates or supplemented with color plates; wherever in the opinion of the author black and white illustration is the best means for identification, black and white plates are still used. In the treatment of subspecies the author has wisely followed the plan initiated in his guide to western birds. The body of the guide deals only with *species* except in cases in which only a single subspecies occurs in the area; subspecies are in general relegated to Appendix II which includes brief descriptions and geographic ranges. This is a meritorious plan; perhaps it could be extended to a complete elimination of subspecific names except in the appendix. Most subspecies cannot be identified with certainty without actual specimens. Since most users of the field guide do not collect specimens the inclusion of trinomials would only seem to tempt their use in a false sense of increased accuracy. It is furthermore biologically completely justifiable to place the emphasis on the *species* as the natural unit. However, the binomial designation of hybrids seems definitely to be of questionable judgment. The revision is generally and primarily one of increased facility contributed by the new and improved plates, more convenient references to plates, self-explanatory legends with each plate, and improved species accounts including "similar species." Based on experience in teaching elementary students it appears that the sparrow plates (57, 58, 59), the warbler plates (48, 49, 50) including the "confusing fall warblers" (51, 52), the vireo plate (47), and the woodpecker plate (41) will prove to be the most valuable innovations. The treatment of the *Empidonax* flycatchers is a useful improvement. The nomenclature is current including many of the changes necessitated by application of the International Code. Appendix I is a classified list of accidentals (less than twenty records) for the area. This field guide is unique among natural history field guides. It is difficult to see how any major improvements can be made on it.—D. S. F.

52. The Travels of William Bartram. Edited by Mark Van Doren. 1947. Dover Publications. New York. 414 pp. $3.75. This classical item of Americana, long a collector's item, now becomes available in "this new, unabridged edition . . ." Known to the student of American literature as a classic of travel narratives written with charming simplicity of style, Bartram's *Travels* also gives an important and apparently reliable insight into the relatively untouched early natural history of North Carolina, South Carolina, Georgia, and Florida of 1770's and 1780's. Chapter X of part II contains many interesting notes on birds as well as other vertebrate animals. This includes Bartram's classical discussion of bird migration in which he notes the passage through Florida of birds which breed in Pennsylvania and in which he suggests that the few winter Robins of Pennsylvania are winter visitants from farther north. This chapter also includes Bartram's list of land birds of southeastern United States. One constantly marvels at the scope and detail of the observations of Bartram. It is an important contribution to modern natural history to have these remarkable observations made readily available. —D. S. F.

53. Birds of the Grey Wind. 3rd Edition. Edward A. Armstrong. 1946. Linsay Drummond. London. x + 174 pp. 12s. 6d. This is a charming collection of Irish bird-lore recorded by an eminent student and observer of the natural history of northern Ireland. Rarely does one find such a wealth of interesting observations woven together in genuine literary quality. Chapter titles such as "The Magnificent Merganser," "The Swans of Moyle," and "The Grey Fisherman" are indicators of Mr. Armstrong's style. An additional indicator is the randomly selected description of a female merganser (p. 54): "She sits valiantly until one of us approaches near enough to stroke her. Then, frightened beyond endurance, the poor bird struggles up from the hole in which lie her ten big, oily-surfaced eggs, and cutting a comical figure scurries down to the sea, where her bright red legs, set far back on her body, will be of more service than in the grass or on the stony beach." Numerous anecdotes, by no means confined to Irish birds, as well as interesting notes on the origin of local names for birds add distinctive flavor. There is an abundance of fine photographs (46 plates). Remarkable are "Cuckoo chick evicting hedge-sparrow's egg" (opposite p. 54) and "Oystercatchers Courting" (opposite p. 68). This little volume would prove itself a welcome addition to anyone's reading library.—D. S. F.

54. Exploring Our National Parks and Monuments. Devereux Butcher. 1947. Oxford University Press. New York. 160 pp. Cloth, $2.75; Kodachrome cover $1.75. A handsome and fascinating volume on the National Parks and Monuments, packed with authentic information on general features of each place and its fauna and flora, as well as data on location, transportation and accommodations. Most of the book is devoted to splendid photographs of scenery and wildlife. There are a map, a number of general articles, including "We Need Wilderness" by Sigurd Olson, and "National Park Service and the Standards" by Newton Drury, and a good bibliography of three pages. The inestimable value of our National Parks and Monuments is continually stressed and also the dangers to which they are constantly exposed by selfish interests. As Robert Sterling Yard wrote: "The national parks and other areas of primitive wilderness with their virgin forests and their original plant life and wildlife have been bequeathed to us by the generation we have succeeded. We, too, must fulfill our trust during our time, and deliver these superb areas unimpaired to the generation following ours." A book to delight and inspire all nature lovers; they should buy it for themselves and their friends and donate it to libraries and schools.—M. M. Nice.

BIRD-BANDING

A Journal of Ornithological Investigation

(Published Quarterly)

James L. Peters, *Editor*
Museum of Comparative Zoology, Cambridge, Massachusetts

Dr. Donald S. Farner, *Assistant Editor*
State College of Washington, Pullman, Washington

Associate Editors
- Margaret Morse Nice, 5725 Harper Ave., Chicago 37, Illinois
- Dr. John T. Emlen, Jr., University of Wisconsin, Madison 6, Wisconsin
- Dr. Eugene P. Odum, University of Georgia, Athens, Georgia

All articles and notes should be submitted to the editor. Manuscripts should be double-spaced and written on only one side of the paper. It is desirable that they reach the editor by the first of the month preceding the month of publication.

Subscription price, $3.50 per year. Single number, $1.00. Subscriptions should be sent to Charles B. Floyd, 210 South Street, Boston, Massachusetts.

Applications for membership in the Northeastern, Eastern and Inland Associations should be sent to their respective secretaries. The annual membership dues are $3.50 per year in the Northeastern Association.

Membership in the Inland and Eastern Associations is $1.00 per year. All members who wish to receive *Bird-Banding* should send $3.00 direct to Charles B. Floyd, 210 South Street, Boston, Mass.

Publications in English and foreign languages for review should be sent to Dr. Donald S. Farner, State College of Washington, Pullman, Washington.

Bound reprints of articles may be had at nominal prices as follows:

No. Copies	4 Pages	8 Pages Self-Cover	12 Pages Self-Cover	16 Pages Self-Cover	Add for Separate Cover
25	6.00	8.50	10.50	12.00	2.25
50	6.50	9.00	11.25	13.00	2.50
75	7.00	9.50	12.00	14.00	2.75
100	7.50	10.00	12.75	15.00	3.00
150	8.00	10.50	13.50	16.00	3.25
200	8.50	11.00	14.25	17.00	3.50

Reprints should be ordered early by writing to the editor, preferably when manuscripts are submitted for publication. Any number may be ordered.

Officers of the three Bird-Banding Associations

Northeastern

Lawrence B. Chapman, *President*

Laurence B. Fletcher
W. Elmer Ekblaw
Alfred O. Gross
Harrison F. Lewis
James L. Peters
Wendell P. Smith
Vice-Presidents

Charles B. Floyd, *Secretary and Treasurer*, 210 South Street, Boston, Massachusetts

Councillors:

Terms Expiring in 1948: Frederick A. Saunders, Dr. Oliver L. Austin, Dr. Winsor M. Tyler

Terms Expiring in 1949: Edwin A. Mason, Dr. Richard L. Weaver, William P. Wharton

Terms Expiring in 1950: Mrs. Kenneth Wetherbee, Mrs. Charles L. Smith, Oscar M. Root

Eastern

Harold B. Wood, M.D., *President*

Horace Groskin
Joseph J. Hickey
Richard B. Fischer
Vice-Presidents

Merrill Wood, *Treasurer*
811 North Allen St., State College, Pa.

Hobart M. Van Deusen, *Secretary*
12 Highland Ave., Montclair, N. J.

Geoffrey Gill, *Editor*
24 Overlook Drive, Huntington, Long Island, N. Y.

Councillors:

Raymond J. Middleton, Charles E. Mohr
Mrs. Herbert Carnes, Joseph M. Cadbury
Rev. Edward Stoehr, John H. Buckalew

Inland

C. C. Ludwig, *President*

M. J. Magee
Philip A. DuMont
Paul E. Downing
Vice-Presidents

M. J. Magee, *Treasurer*
O. A. Stevens, *Secretary*